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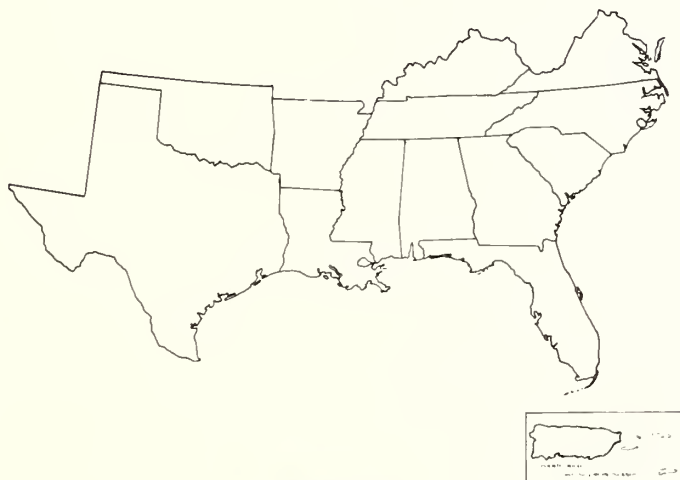
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# ENDANGERED & THREATENED SPECIES

of the  
Southeastern  
United States

Including Puerto Rico and the Virgin Islands



U. S. DEPARTMENT OF AGRICULTURE • FOREST SERVICE

073

Control No. \_\_\_\_\_



ENDANGERED AND THREATENED SPECIES  
OF THE SOUTHEASTERN UNITED STATES  
INCLUDING PUERTO RICO AND THE VIRGIN ISLANDS

Compiled and Edited by  
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\*At the time of the initial compilation, Dr. Robinson was an Endangered Species Specialist, Special Forestry Services Staff, Cooperative Forestry, Southeastern Area, State and Private Forestry, USDA Forest Service, Atlanta, Ga. He is now with the Fish and Wildlife Service, 75 Spring Street, Atlanta, Ga. 30303. Dr. Kral (see "Acknowledgments") provided the material for the individual species accounts herein. Dr. Robinson developed the county distribution maps and edited the species description management guides, and wrote the glossary and other sections.



## ACKNOWLEDGMENTS

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The Forest Service is particularly indebted to the following individuals for herbarium information that was critical in developing the plant distribution sections of this notebook and field identification cards: **J. D. Freeman** of Auburn University; **L. C. Anderson**, **A. Clewell**, and **R. K. Godfrey** of Florida State University; **D. B. Ward** of the University of Florida; **W. H. Duncan** and **S. B. Jones** of the University of Georgia; **R. D. Porcher** of the Citadel; **L. Collins** of the Tennessee Valley Authority; **R. Kral** of Vanderbilt University; **M. A. Evans** and **E. B. Wofford** of the University of Tennessee; and **D. F. Austin** of the Florida Atlantic University.

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## PREFACE

This notebook assembles current information on Federally-listed endangered and threatened species. This initial work includes 65 of the 204 species for which information has been developed. The remaining species will be added in the future as the reviews, editing and county distribution maps are completed. The notebook (and other notebooks described later), however, may include information on proposed threatened or endangered species, and species now under review. Definitions of these categories begin on page v (see "INITIAL STEP") of the Preface. We intend to update information whenever listing or other changes occur. If you have any questions about this notebook, call the Special Forestry Services Staff, Southeastern Area, Atlanta, or write to the attention of the Endangered Species Specialist, Special Forestry Services Staff, Southeastern Area, USDA Forest Service, 1720 Peachtree Road, N.W., Suite 300, Atlanta, Ga. 30309.

The contents of the notebooks vary and are determined by the user's particular needs. The regional notebook will include all of the species description/management guides for species in the South. That notebook is targeted for those who are involved with endangered species in more than one State. The State notebooks will include only those species description/management guides for the species found within that particular State. Likewise, the county notebooks will include those species description guides for species found within that specific county.

Only the county notebooks will include the known location (sites) of the proposed or listed threatened and endangered plants for which species description/management guides have been included. The site is a circular area centered on the known location as indicated in the table by an "X." The site has a radius of 1.25 miles (1.6 km). Furthermore, a site may include more than one location for the species. Other endangered species that occur within the area of the site, but not at the specific center, will be indicated by coding a "G" instead of an "X" in the appropriate columns on the table.

Most of the information presented on the anticipated effects of forest management practices on a species is based on professional experience and judgement rather than on formal research. The forest management advice given here **IS NOT THE FINAL WORD**, but simply a starting point upon which to build as additional information becomes available. Original estimates were based primarily on Dr. Kral's knowledge of the habitat gained through years of personal field observations. These estimates were reviewed by professional foresters, botanists and researchers. Their comments have been used to revise the species description/management guides. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. The abbreviation "NA" indicates that the plant grows in a habitat for which the prescribed forest management practice is not economically feasible or is not normally used.

Estimates are rough in many instances and results or practices may vary depending upon degree of application, intensity, nearness to plant species, etc. Further research is needed. Therefore, as research data becomes available and as observations are made in the field by users of these guides, the anticipated effects and management recommendations will be updated.

Estimates have been made on the effects of nine forestry practices on plant growth. Practices included are drainage, prescribed burning, root raking, bedding, drum chopping, thinning overstory, removing overstory, establishing plantation and grazing. The direct effects of herbicides on plant growth were not estimated for individual species because very little sensitivity data is available. The anticipated effects from direct application of herbicides should be similar to that for species having the same growth forms, i.e., herbaceous forbes, grasses or woody plants. Thus, **USE CAUTION** to ensure that herbicides intended for control of undesirable vegetation are not applied to those species that are listed by the U. S. Fish and Wildlife Service as threatened or endangered. Indirect effects would likely be similar to those estimated to occur following thinning or removal of the overstory.

Estimates of the effects of forestry practices on plant growth are based on the following definitions:

**Prescribed burn.**--Burning done by trained crews under carefully prescribed weather and fuel conditions. Burning is frequently used to reduce fire hazards from accumulated fuel, for rough reduction, or to improve wildlife habitats, seed beds or other related purposes.

**Bulldozing and root raking.**--A site preparation technique used to remove trees and shrubs. Root rakes normally replace the dozer blade and are large metal frames with rake-like teeth which point forward. These teeth are pushed through the topsoil by track type tractors. This action generally rips out the brush, stumps and trees by their roots. They are then pushed into a windrow or brush piles. Another method of clearing is with the use of a K-G blade. K-G blades shear the stems at ground level and the operator continues to push and pile the debris into windrows.

**Bedding.**--Used to provide an elevated planting bed which has improved surface drainage. The area to be bedded must be relatively free of logging debris and vegetation. Bedding is done by pulling a disk type attachment which disks the soil up into parallel strips of raised earth typically 5 inches (12.7 cm) or more high and about 8 feet (2.4 m) wide. Seedlings are then planted down the center of the bed in rows 8 to 12 feet (2.4 to 3.7 m) apart. The wider spacings usually leave 2 to 3 feet (.6 to .9 m) of undisturbed area between the beds.

**Drum chopping.**--A site preparation technique which reduces competition without removing topsoil or displaying organic matter horizontally. Drum choppers are rolling cylinders with raised, diagonally placed blades which crush and fracture plant and other materials over which they pass. They are pulled behind large tractors. The number of drums may vary from one to three. As the drum rolls along, the cutting blades uproot, crush and compact the woody and other vegetative material. Trees that are scattered or are too large to push over are normally treated by other methods.

**Thinning overstory.**--All commercial cuts which remove selected trees before the regeneration cut. Depending on the frequency and intensity of cuts, thinning will increase the amount of light reaching the understory.

**Removing overstory.**--Regeneration cuts which include selective cutting, clearcuts of all merchantable timber, cuts which leave seed trees, or silvicultural clearcuts which remove all canopy trees.

**Establishing plantation.**--When trees are planted and become well-established in rows, the tree canopy will close, in time reducing the amount of light which reaches the soil surface. This reduced light affects plant growth.

**Grazing.**--The trampling, feeding and/or breaking of plant parts occurs readily when domestic cattle feed and use an area.

As noted earlier, the notebooks include information on listed as well as proposed threatened and endangered species. Though many of these proposed threatened and endangered species are not Federally protected, many States protect these species, thus requiring conservation efforts. Also, if conservation efforts can be started early enough, many species now considered endangered or threatened may recover, thereby voiding the need for special protection.

Many of these proposed threatened and endangered species are not described in southern floras. On the other hand, the species may actually be more abundant and widespread than current data shows. Thus, as species description/management guides become valuable identification tools, they may help to validate the actual distribution of species and by so doing provide data which will help delist some species now protected under the 1973 Endangered Species Act, as amended in 1978.

What is the process by which species are listed? The INITIAL STEP is nomination. Species may be nominated by scientists, the States, Federal agencies or the public. The Office of Endangered Species of the Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service (NMFS) screens the material and determines whether a review is warranted. If they determine that the answer is no, they so notify the originator. However, if the answer is yes, then the second phase of listing must begin within 90 days of the initial petition.

The SECOND PHASE centers on information gathering. A notice of review is published in the Federal Register with a request for comments and information. The status term "Under Review" (UR) is used in the species description/management guides and species list to designate those species which currently are in Phase Two. Normally, 30 days is allowed for comments from interested parties; however, this period is optional and may be extended. Also, during this period, data is solicited from all relevant sources. The State governors are also advised if the species occurs within their States. They have 90 days to comment. Thus, if a State forestry agency chooses to amplify its response, comments may be sent both through the governor's office and through the USDA Forest Service's Southeastern Area. At the end of the comment period, FWS and/or NMFS reviews the information and prepares a status report. They decide whether to propose the species for listing and prepare an environmental assessment. If the data shows that listing is not warranted, a reply is sent to the originator and the listing process stops at this time. However, there is no set time by which the collection of data and the review of material must be completed. Thus, the species may be in a review status indefinitely before it is officially dropped from consideration for listing. If the species warrants listing, Phase Three begins. If enough data is supplied with the nomination of a species and this data allows FWS/NMFS to determine that the species warrants consideration of listing, a review of status need not be published in the Federal Register.

PHASE THREE begins with a published proposed rulemaking action in the Federal Register. The following information is given:

Scientific name and common name

Portion of range where the species is threatened or endangered

Summary of facts

Special regulations if species is proposed as threatened.

Thus status terms "Proposed Endangered" or "Proposed Threatened" (PE or PT) are used in the species description/management guides and species lists to designate those species which are in Phase Three.

If a proposed threatened or endangered species occurs in other countries, the FWS will consult with such countries in cooperation with the Secretary of State. A minimum of 60 days is allowed to receive comments from any interested party. Public hearings may be requested during this period. The FWS/NMFS may respond by holding a hearing. They notify the requester and publish the times and places in the Federal Register.

After public hearings are held, the FWS/NMFS compiles and analyzes the information and determines whether the species is threatened, endangered or non-threatened. If the species is non-threatened, the originator is notified and the species is dropped from further consideration at that time. The species may be in an analysis period for 2 years from the date of proposed rulemaking action (Phase Three) before it is officially dropped or listed. If the species is not listed within the 2-year period, the Secretary of Interior withdraws the proposed regulation. A notice of the withdrawal is published in the Federal Register no later than 30 days after the end of such period.

If the species warrants listing, a final rulemaking action is published in the Federal Register. The species is designated as either threatened or endangered. Those species which have had final rulemaking action will have a status of endangered or threatened (E or T) in the appropriate section of the species description/management guides and species lists. If the species is endangered, the law explicitly states what actions are acceptable. There is essentially no mitigation. However, if the species is determined to be threatened, listing may include qualifying statements. Thus, the degree of protection may not be as absolute as if it is listed as endangered. When final listing is done, the species then becomes fully protected by the Endangered Species Act. However, there are no provisions against taking plants except for the interstate commerce provision.

Thus, a species may be listed in as little as 3 months, but normally should take at least 6 months (and in practice may take even longer). However, the maximum time should not exceed 2 years from the date of the proposed rulemaking action.

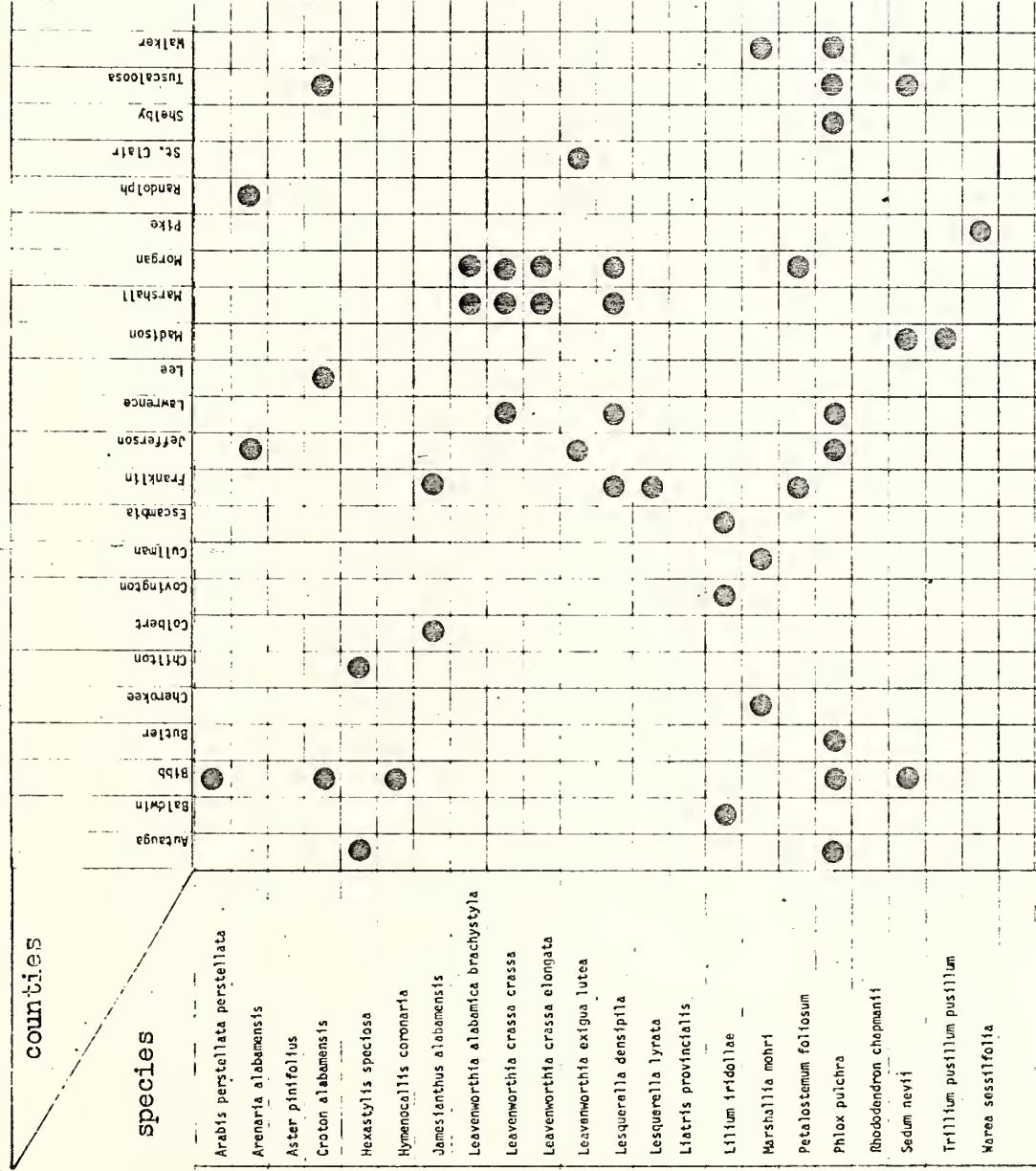
Species published in the Smithsonian Institution's 1978 publication, Endangered and Threatened Plants of the United States, are not protected by the Endangered Species Act, unless they have gone through the rulemaking process. Those species listed by the Smithsonian which are not in one of the above listing phases are included on the species lists for informational purposes because many may soon be nominated. The status term "Smithsonian Report--endangered, threatened or extinct (SRE, SRT, SREX)," is used in the species list to designate these species.







County distribution of federally proposed endangered plant species of Alabama for which species description-management guides have been prepared.





County distribution of federally proposed endangered plant species of Arkansas for which species description-management guides have been prepared.

species	counties																															
	Baxter	Benton	Boone	Carroll	Cleburne	Conway	Crawford	Franklin	Fulton	Garland	Howard	Independence	Izard	Johnson	Logan	Madison	Marion	Montgomery	Newton	Perry	Polk	Pope	Pulaski	Saline	Scott	Searcy	Stone	Van Buren	Washington	Yell		
<i>Castanea ozarkensis</i>	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
<i>Eriocaulon kornickianum</i>	●	●	●												●				●		●											
<i>Trillium pusillum ozarkanum</i>	●	●	●												●				●		●											



species	counties	
	Alachua	Baker
<i>Asinus tetramerus</i>		
<i>Aster pinifolius</i>		
<i>Baldonia atropurpurea</i>		
<i>Baptisia calycosa</i>		
<i>Conradina brevifolia</i>		
<i>Cuphea aspera</i>		
<i>Dicranandra frutescens</i>		
<i>Dicerandra immaculata</i>		
<i>Gentiana pennelliana</i>		
<i>Harporocallis flava</i>		
<i>Hedeoma graveolens</i>		
<i>Hymenocallis coronaria</i>		
<i>Hypericum cumulicola</i>		
<i>Justicia cooley1</i>		
<i>Justicia crassifolia</i>		
<i>Liatris ohlingerae</i>		
<i>Liatris provincialis</i>		
<i>Lilium iridolae</i>		
<i>Linum vestiti</i>		
<i>Macbridea alba</i>		
<i>Marshallia schott1</i>		
<i>Nolina atropocarpa</i>		
<i>Nolina brittoniana</i>		
<i>Oxypolis graveant1</i>		
<i>Paronychia chartacea</i>		
<i>Pinguicula lonantha</i>		
<i>Polygonella ciliata basirania</i>		
<i>Polygonella myrtillophylla</i>		
<i>Rhexia parviflora</i>		
<i>Rhododendron chapman11</i>		
<i>Silene polypetala</i>		
<i>Vicia ocalensis</i>		
<i>Warea sessilifolia</i>		
<i>Zania integrifolia</i>		



County distribution of federally proposed endangered plant species of Georgia for which species description-management guides have been prepared.

species	counties																																			
	Brantley	Bulloch	Burke	Camden	Candler	Coffee	Colquitt	Columbia	Cook	Crawford	Decatur	Emanuel	Evans	Floyd	Glynn	Grady	Harris	Irwin	Lincoln	Long	Lowndes	Richmond	Screven	Seminole	Sumter	Talbot	Tattnall	Telfair	Tift	Toombs	Turner	Upson	Wayne	Worth		
<i>Aster pinnifolius</i>																																				
<i>Balduna atropurpurea</i>																																				
<i>Baptisia arachnifera</i>																																				
<i>Elliottia racemosa</i>																																				
<i>Finbristylis perpusilla</i>																																				
<i>Hymenocallis coronaria</i>																																				
<i>Linum westii</i>																																				
<i>Marshallia mohrli</i>																																				
<i>Rhexia parviflora</i>																																				
<i>Rhododendron minus chapmanii</i>																																				
<i>Sedum nevii</i>																																				
<i>Silene polypetala</i>																																				
<i>Zamia integrifolia</i>																																				



County distribution of federally proposed endangered plant species of Kentucky for which species description - management guides have been prepared.

species	counties													
	Bullitt	Casey	Fleming	Franklin	Jefferson	Livinston	Lyon	McCreary	Menifee	Nicholas	Powell	Robertson	Warren	Wolfe
Apios priceana						●	●					●		
Arabis perstellata perstellata				●										
Conradina verticillata								●						
Leavenworthia exigua laciniata	●				●									
Silphium brachiatum														
Solidago albopilosa									●		●		●	
Solidago shortii			●							●		●		
Trillium pusillum pusillum		●												



County distribution of federally proposed endangered plant species of Louisiana for which species description - management guides have been prepared.

[illegible]



County distribution of federally proposed endangered plant species of Mississippi for which species description - management guides have been prepared.

[illegible]



County distribution of federally proposed endangered plant species of North Carolina for which species description - management guides have been prepared.

species	counties
<i>Arenaria alabamensis</i>	Haywood
<i>Sedum nevii</i>	Jackson
<i>Trillium pusillum pusillum</i>	Pender
	Rockingham
	Rutherford
	Surry
	Wake



County distribution of federally proposed endangered plant species of Oklahoma for which species description -  
management guides have been prepared.

species	counties												
	Adair	Cherokee	Delaware	Latimer	LeFlore	McCurtain	Mayes	Muskogee	Pushmataha	Rogers	Washington		
<i>Calamovilfa arcuata</i>	●	●	●	●	●	●	●		●	●	●		
<i>Castanea ozarkensis</i>		●	●	●	●	●	●	●	●				
<i>Eriocaulon kornickianum</i>		●	●	●	●	●	●	●	●				



County distribution of federally proposed endangered plant species of South Carolina for which species description - management guides have been prepared.

species	counties											
	Aiken	Berkeley	Calhoun	Dorchester	Orangeburg							
<i>Elliottia racemosa</i>	●											
<i>Hymenocallis coronaria</i>												
<i>Trillium pusillum pusillum</i>		●	●	●	●							



County distribution of federally proposed endangered plant species of Tennessee for which species description-management guides have been prepared.

species	counties														
	Anderson	Bedford	Cheatham	Coffee	Cumberland	Davidson	Fentress	Franklin	Giles	Marshall	Maury	Montgomery	Morgan	Polk	Rutherford
<i>Apios priceana</i>															
<i>Arabis perstellata ampla</i>															
<i>Calamovilfa arcuata</i>															
<i>Conradina verticillata</i>															
<i>Croton alabamensis</i>															
<i>Echinacea tennesseensis</i>															
<i>Hymenocallis coronaria</i>															
<i>Leavenworthia crassa crassa</i>															
<i>Leavenworthia exigua lutea</i>															
<i>Lesquerella densipila densipila</i>															
<i>Lesquerella perforata</i>															
<i>Lesquerella stonensis</i>															
<i>Petalostemum foliosum</i>															
<i>Sedum nevii</i>															
<i>Silphium brachiatum</i>															
<i>Silphium integrifolium gattingeri</i>															
<i>Trillium pusillum pusillum</i>															



County distribution of federally proposed endangered plant species of Texas for which species description - management guides have been prepared.

[illegible]

September 1979



County distribution of federally proposed endangered plant species of Virginia for which species description - management guides have been prepared.

species	counties / cities													
	Accomack	City of Chesapeake	Craig	Dinwiddie	Giles	Henrico	James City	Montgomery	City of Suffolk					
<i>Iliamna remota</i>					●									
<i>Sedum nevillei</i>		●	●		●			●						
<i>Trillium pusillum virginianum</i>	●	●		●		●	●		●					



List of threatened, endangered and sensitive plant species of the southeastern United States 1/

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Abutilon commutatatum	Puerto Rico abutilon	Malvaceae	SR-E
	Abutilon marshallii	Marsh's abutilon	Malvaceae	UR
	Acacia emoryana	Emory's acacia	Fabaceae	PE
	Acer grandidentatum sinuosum	Uvalde bigtooth maple	Aceraceae	UR
	Acleisanthes crassifolia	Texas crumpets	Nyctaginaceae	UR
	Agalinis caddoensis	Caddo parish false-foxglove	Scrophulariaceae	PE
	Agalinis purpurea carteri	Carter's large purple false-foxglove	Scrophulariaceae	UR
	Agalinis stenophylla	narrow-leaved false-foxglove	Scrophulariaceae	PE
	Agave chisoensis	Chisos agave	Lilaceae	UR
	Agave eggersiana	Eggers' agave	Liliaceae	SR-E
	Agrimonia incisa	incised groove bur	Rosaceae	UR
	Aletes filifolius	narrow-leaved aletes	Apiaceae	UR
	Allium perdulce sperryi	Sperry's onion	Liliaceae	UR
	Alnus maritima	sea-side alder	Betulaceae	UR

1/ Federally listed species include threatened (T), endangered (E), proposed threatened (PT), and proposed endangered (PE). Sensitive species include species currently under consideration for listing by the U. S. Fish and Wildlife Service (UR) and those additional species listed by the Smithsonian Institution as threatened (SR-T), endangered (SR-E) or extinct (SR-EX).

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	<i>Ambrosia cheiranthifolia</i>	Gray's ragweed	Asteraceae	PE
	<i>Amoreuxia wrightii</i>	Wright's yellowshow	Cochlospermaceae	UR
	<i>Amorpha ouachitensis</i>	Ouachita Mountain indigobush	Fabaceae	SR-E
	<i>Amorpha roemeriana</i>	hill country indigobush	Fabaceae	SR-T
	<i>Amorpha texana</i>	Texas indigobush	Fabaceae	UR
200	<i>Amphianthus pusillus</i>	little amphianthus	Scrophulariaceae	PE
	<i>Amsonia glaberrima</i>	hairless blue-star	Apocynaceae	UR
	<i>Amsonia repens</i>	creeping blue-star	Apocynaceae	UR
	<i>Amsonia tharpii</i>	Tharp's blue-star	Apocynaceae	UR
	<i>Ancistrocactus tobuschii</i>	Bandera county ancistrocactus	Cactaceae	PE
	<i>Andrachne arida</i>	desert buck-brush	Euphorbiaceae	PE
183	<i>Andropogon arctatus</i>	pine-woods bluestem	Poaceae	PE
	<i>Anemone edwardsiana edwardsiana</i>	Edward's plateau anemone	Ranunculaceae	SR-T
	<i>Anemone edwardsiana petraea</i>	glaborous-seeded plateau anemone	Ranunculaceae	SR-T
	<i>Anemone minima</i>	dwarf anemone	Ranunculaceae	UR
	<i>Anguria cookiana</i>	Cook's gourd	Cucurbitaceae	SR-E
	<i>Anthericum chandleri</i>	Chandler's anthericum	Liliaceae	UR
33	<i>Apios priceana</i>	Price's groundnut	Fabaceae	PE

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
189	<i>Aquilegia canadensis australis</i>	southern columbine	Ranunculaceae	PE
	<i>Aquilegia chaplinei</i>	McKittrick columbine	Ranunculaceae	PE
	<i>Aquilegia hinckleyana</i>	Hinckley's columbine	Ranunculaceae	PE
	<i>Arabis georgiana</i>	Georgia rock-cress	Brassicaceae	UR
41A	<i>Arabis perstellata ampla</i>	large prairie rock-cress	Brassicaceae	PE
41B	<i>Arabis perstellata perstellata</i>	small prairie rock-cress	Brassicaceae	PE
	<i>Arabis petiolaris</i>	Brazos rock-cress	Brassicaceae	UR
49	<i>Arenaria alabamensis</i>	Alabama sandwort	Caryophyllaceae	PE
19	<i>Arenaria fontinalis</i>	pioneer sandwort	Caryophyllaceae	UR
	<i>Arenaria godfreyi</i>	Godfrey's sandwort	Caryophyllaceae	UR
	<i>Arenaria livermorensis</i>	Livermore sandwort	Caryophyllaceae	PE
	<i>Argythamnia aphoroides</i>	Hill county wild-mercury	Euphorbiaceae	PE
	<i>Argythamnia argyraea</i>	silver wild-mercury	Euphorbiaceae	PE
	<i>Argythamnia blodgettii</i>	Blodgett's wild-mercury	Euphorbiaceae	UR
	<i>Aristida floridana</i>	Florida three-awned grass	Poaceae	PE
	<i>Aristida portoricensis</i>	Puerto Rico three-awned grass	Poaceae	SR-E
	<i>Aristida simpliciflora</i>	southern three-awned grass	Poaceae	UR
2	<i>Asclepias viridula</i>	southern milkweed	Asclepiadaceae	UR

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
108	Asimonia tetramera	opposum pawpaw	Annonaceae	PE
	Asplenium ebenoides	Scott's spleenwort	Polypodiaceae	UR
	Asplenium heteroresiliens	Wagner's spleenwort	Polypodiaceae	UR
	Asplenium kentuckiense	Kentucky spleenwort	Polypodiaceae	UR
	Asplenium plenum	double spleenwort	Polypodiaceae	UR
	Aster brachypholis	Apalachicola River aster	Asteraceae	UR
117	Aster pinifolius	pale-violet aster	Asteraceae	PE
103	Aster plumosus	plumose aster	Asteraceae	UR
	Aster scabrimaculis	rough-stemmed aster	Asteraceae	UR
3	Aster spinulosus	pine-woods aster	Asteraceae	UR
	Aster verutifolius	Ocean Springs aster	Asteraceae	UR
	Astragalus mollissimus marcidus	Marcid's woolly milkvetch	Fabaceae	UR
34	Astragalus tennesseensis	Tennessee milkvetch	Fabaceae	UR
	Astranthium robustum	robust western-daisy	Asteraceae	UR
	Atriplex klebergorum	Kleberg's saltbush	Chenopodiaceae	PE
	Aureolaria patula	spreading foxgloves	Scrophulariaceae	UR
	Bacopa simulans	Charles City water-hyssop	Scrophulariaceae	PE
	Bacopa stragula	mat-forming water-hyssop	Scrophulariaceae	PE
	Bahia bigelovii	Bigelow bahia	Asteraceae	UR

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
102	Balduina atropurpurea	purple balduina	Asteraceae	PE
55	Banara vanderbiltii	Vanderbilts' banara	Flacourtiaceae	SR-E
130	Baptisia arachnifera	hairy wild-indigo	Fabaceae	E
	Baptisia calycosa	pineland wild-indigo	Fabaceae	UR
	Baptisia hirsuta	hairy wild-indigo	Fabaceae	UR
	Baptisia megacarpa	Apalachicola wild-indigo	Fabaceae	SR-T
	Baptisia riparia	stream side wild-indigo	Fabaceae	PE
56	Baptisia simplicifolia	coastal-plain wild-indigo	Fabaceae	UR
	Bartonia texana	Texas screwstem	Gentianaceae	PE
	Berberis swaseyi	Texas barberry	Berberidaceae	UR
	Betula uber	Virginia little-leaved birch	Betulaceae	E
	Boerhaavia mathisiana	Mathison's spiderling	Nyctaginaceae	SR-T
22	Bonamia grandiflora	large-flowered bonamia	Convolvulaceae	UR
	Bothriochloa exaristata	awnless bluestem	Poaceae	UR
	Brachionidium ciliolatum	fringed brachionidium	Orchidaceae	SR-E
	Brazoria pulcherrima	Centerville brazosmint	Lamiaceae	PE
	Brickellia brachyphylla hinckleyi	Hinkley's plume brickell-bush	Asteraceae	UR
	Brickellia brachyphylla terlinguensis	terlingia plume brickell-bush	Asteraceae	UR
104	Brickellia cordifolia	Flyr's brickell-bush	Asteraceae	UR

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Brickellia dentata	leafy brickell-bush	Asteraceae	UR
	Brickellia eupatorioides floridana	Florida thoroughwort brickell-bush	Asteraceae	UR
	Brickellia leptophylla	narrow-leaved brickell-bush	Asteraceae	UR
	Brickellia shinneri	Shiner's brickell-bush	Asteraceae	UR
	Brickellia viejensis	Sierra Vieja brickell-bush	Asteraceae	PE
	Bromus texensis	Texas brome-grass	Poaceae	UR
	Brongniartia minutifolia	little-leaved brongniartia	Fabaceae	PE
	Brunfelsia portoricensis	Puerto Rico lady-of-the-night	Solanaceae	SR-T
	Buckleya distichophylla	common piratebush	Santalaceae	UR
	Bumelia thornei	Thorn's false buckthorn	Sapotaceae	PE
	Buxus vahlia	Vahl's boxwood	Buxaceae	SR-E
105	Cacalia diversifolia	variable-leaved indian-plantain	Asteraceae	UR
	Cacalia rugelia	Rugel's indian-plantain	Asteraceae	SR-T
	Caesalpinia brachycarpa	short-podded nicker	Fabaceae	UR
	Caesalpinia culebrae	smooth yellow nicker	Fabaceae	SR-E
	Caesalpinia drummondii	dwarf nicker	Fabaceae	UR
	Caesalpinia monensis	black nicker	Fabaceae	SR-T
	Caesalpinia portoricensis	brown nicker	Fabaceae	SR-E

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	<i>Calamagrostis cainii</i>	Cain's reedgrass	Poaceae	SR-T
	<i>Calamagrostis porteri</i>	Porter's reedgrass	Poaceae	UR
88	<i>Calamintha ashei</i>	Ash's savory	Lamiaceae	UR
89	<i>Calamintha dentata</i>	toothed savory	Lamiaceae	UR
146	<i>Calamovilfa arcuata</i>	cumberland reedgrass	Poaceae	PE
	<i>Calamovilfa brevipilis brevipilis</i>	common soft-haired reedgrass	Poaceae	UR
	<i>Calamovilfa brevipilis calvipes</i>	Virginia soft-haired reedgrass	Poaceae	UR
184	<i>Calamovilfa curtissii</i>	Curtis' reedgrass	Poaceae	PE
	<i>Calliandra biflora</i>	two-flowered stick-pea	Fabaceae	PE
	<i>Callicarpa ampla</i>	large beautyberry	Verbenaceae	SR-T
	<i>Callirhoe papaver bushii</i>	Bush's woods poppy-mallow	Malvaceae	UR
	<i>Callirhoe scabriuscula</i>	Texas poppy-mallow	Malvaceae	PE
	<i>Calyptranthes luquillensis</i>	Luquillensis lidflower	Myrtaceae	SR-T
	<i>Calyptranthes peduncularis</i>	stalked lidflower	Myrtaceae	SR-E
	<i>Calyptranthes thomasiana</i>	Thomson's lidflower	Myrtaceae	SR-E
	<i>Calyptranthes triflorum</i>	clover lidflower	Myrtaceae	SR-E
	<i>Calyptronoma rivalis</i>	creek calyptronoma	Areaceae	SR-E
	<i>Campanula reverchonii</i>	basin bellflower	Campanulaceae	UR

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Campanula robinsiae	Brooksville bellflower	Campanulaceae	PE
	Canna pertusa	tattered canna	Cannaceae	SR-E
	Cardamine longii	Long's bitter-cress	Brassicaceae	UR
	Cardamine micranthera	piedmont bitter-cress	Brassicaceae	PE
23	Carex amplisquama	Fort Mountain sedge	Cyperaceae	UR
	Carex austrocaroliniana	southern appalachian sedge	Cyperaceae	SR-T
24	Carex baltzellii	Baltzell's sedge	Cyperaceae	UR
	Carex biltmoreana	Biltmore's sedge	Cyperaceae	PE
25	Carex chapmannii	Chapman's sedge	Cyperaceae	UR
	Carex fissa	split sedge	Cyperaceae	SR-T
	Carex latebracteata	Waterfall's sedge	Cyperaceae	UR
	Carex misera	wretched sedge	Cyperaceae	UR
	Carex purpurifera	purple sedge	Cyperaceae	UR
	Carex roanensis	Roan Mountain sedge	Cyperaceae	SR-T
	Cassia exunguis	tamarindillo senna	Fabaceae	SR-E
	Cassia keyensis	Florida keys senna	Fabaceae	PE
	Cassia mirabilis	Puerto Rico senna	Fabaceae	SR-E
	Cassia ripleyana	Ripley's senna	Fabaceae	SR-T

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
58	Castanea ozarkensis	Ozark chinquapin	Fagaceae	PE
	Castilleja ciliata	fringed indian-paintbrush	Scrophulariaceae	PE
	Castilleja elongata	tall indian-paintbrush	Scrophulariaceae	UR
	Castilleja ludoviciana	Jeff Davis parish indian-paintbrush	Scrophulariaceae	PE
	Centrosema arenicola	sand butterfly pea	Fabaceae	PE
	Cerastium clawsonii	Clawson's chickweed	Caryophyllaceae	PE
	Ceratophyllum floridanum	Florida hornwort	Ceratophyllaceae	PE
	Cereus eriophorus fragrans	fragrant wool-bearing cereus	Cactaceae	PE
	Cereus gracilis aboriginum	original prickly-apple cereus	Cactaceae	PE
	Cereus gracilis simpsonii	Simpson's prickly-apple cereus	Cactaceae	PE
	Cereus greggii	desert night-blooming cereus	Cactaceae	SR-T
	Cereus robinii deeringii	Deering's tree cactus cereus	Cactaceae	SR-E
	Cereus robinii robinii	Robin's tree cactus cereus	Cactaceae	PE
	Chaetopappa hersheyi	Guadalupe cliff daisy	Asteraceae	UR
	Chamaesyce cumulicola	sand-dune spurge	Euphorbiaceae	UR
	Chamaesyce deltoidea deltoidea	wedge spurge	Euphorbiaceae	UR
	Chamaesyce deltoidea serpyllium	wild thyme spurge	Euphorbiaceae	PE
	Chamaesyce garberi	Garber's spurge	Euphorbiaceae	SR-E
	Chamaesyce porteriana keyensis	Porter's hairy podded spurge	Euphorbiaceae	PE

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Chamaesyce porteriana porteriana	Porter's broad-leaved spurge	Euphorbiaceae	UR
	Chamaesyce porteriana scoparia	Porter's broom spurge	Euphorbiaceae	PE
	Chelone obliqua speciosa	rose turtlehead	Scrophulariaceae	SR-T
	Chiononthus pygmaeus	pygmy fringe-tree	Oleaceae	UR
	Chloris texensis	Texas windmill-grass	Poaceae	UR
15	Cimicifuga rubifolia	Appalachian bugbane	Ranunculaceae	UR
	Cirsium turneri	cliff thistle	Asteraceae	UR
	Cladrastis kentukea	American yellow-wood	Fabaceae	SR-T
190	Clematis addisonii	Addison's leather-flower	Ranunculaceae	PE
	Clematis gattereri	Gattinger's leather-flower	Ranunculaceae	PE
	Clematis micrantha	old-man's beard virgin-bower	Ranunculaceae	PE
191	Clematis viticaulis	grape leather-flower	Ranunculaceae	PE
	Cleome multicaulis	many-stemmed spider-flower	Capparidaceae	UR
	Clitoria fragrans	sweet-scented butterfly-pea	Fabaceae	UR
	Colubrina stricta	comal snakewood	Rhamnaceae	PE
	Commelina gigas	climbing dayflower	Commelinaceae	UR
	Condalia hookeri edwardsiana	Edward's Brasil condalia	Rhamnaceae	PE
60	Conradina brevifolia	short-leaved rosemary	Lamiaceae	PE

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Conradina glabra	panhandle rosemary	Lamiaceae	PE
90	Conradina grandiflora	large-flowered rosemary	Lamiaceae	UR
61	Conradina verticillata	whorled-leaved rosemary	Lamiaceae	PE
	Cordia bellonis	showy cordia	Boraginaceae	SR-E
	Cordia rupicola	cliff cordia	Boraginaceae	SR-T
	Cordia wagnerorum	Wagner's cordia	Boraginaceae	SR-E
	Coreopsis heterolepis	varying tickseed	Asteraceae	UR
163	Coreopsis intermedia	golden-wave tickseed	Asteraceae	PE
	Coreopsis latifolia	broad-leaved tickseed	Asteraceae	SR-T
	Coreopsis pulchra	beautiful tickseed	Asteraceae	SR-T
	Cornutia obovata	montane cornutia	Verbenaceae	SR-E
	Coryphantha dasyacantha varicolor	varied-colored long-stemmed corycactus	Cactaceae	UR
	Coryphantha duncanii	Duncan's corycactus	Cactaceae	UR
	Coryphantha hesteri	Hester's corycactus	Cactaceae	UR
	Coryphantha minima	minute corycactus	Cactaceae	PE
	Coryphantha ramillosa	Big Bend corycactus	Cactaceae	PE
	Coryphantha scheeri unicata	Scheer's hooked spined corycactus	Cactaceae	PE

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Coryphantha sneedii sneedii	Sneed's Franklin Mtn. corycactus	Cactaceae	PE
	Coryphantha strobiliformis durispina	hard-spined incense corycactus	Cactaceae	PE
	Coryphantha sulcata nickelsiae	Nickelson's grooved corycactus	Cactaceae	UR
	Coursetia axillaris	Texas baby-bonnets	Facaceae	UR
	Crataegus berberifolia	barberry-leaved hawthorn	Rosaceae	UR
	Crataegus harbinsonii	Harbison hawthorn	Rosaceae	PE
	Crataegus stenosepala	narrow-sepaled hawthorn	Rosaceae	UR
	Crataegus sutherlandensis	Southerland's hawthorn	Rasaceae	UR
	Crataegus warneri	Warner's hawthorn	Rosaceae	UR
	Crescentia portoricensis	Puerto Rican calabash	Bignoniaceae	SR-E
152	Croomia pauciflora	few-flowered croomia	Stemonaceae	UR
53	Croton alabamensis	Alabama croton	Euphorbiaceae	PE
172	Croton elliotii	Elliott's croton	Euphorbiaceae	PE
	Croton fishlockii	Fishlock's croton	Euphorbiaceae	SR-T
	Croton glandulosus simpsonii	Simpson's glandular croton	Euphorbiaceae	PE
	Croton impressus	Puerto Rico croton	Euphorbiaceae	SR-E
	Cryptantha crassipes	Terlingua Creek cat's-eye	Boraginaceae	UR
	Ctenium floridanum	Florida orange-grass	Poaceae	UR

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
143	Cucurbita okeechobeensis	Okeechobee gourd	Cucurbitaceae	UR
	Cucurbita texana	Texas gourd	Cucurbitaceae	UR
	Cuphea aspera	tropical waxweed	Lythraceae	PE
	Cuscuta attenuata	slender dodder	Cuscutaceae	SR-T
	Cuscuta harperi	Harper's dodder	Cuscutaceae	UR
	Cyathea dryopteroides	hardy treefern	Cyatheaaceae	SR-E
	Cyclodon alabamense	Alabama cyclodon	Asclepiadaceae	SR-E
	Cymophyllus fraseri	Fraser's sedge	Cyperaceae	UR
	Cynanchum monense	Mona Island shallow-wort	Asclepiadaceae	SR-E
	Cyperus granitophilus	granite-loving flatsedge	Cyperaceae	UR
27	Cyperus onerosus	burdensome flatsedge	Cyperaceae	UR
	Cyperus urbanii	urban flatsedge	Cyperaceae	SR-E
	Cypripedium candidum	small white lady-slipper	Orchidaceae	UR
	Dalea bartonii	Barton's dalea	Fabaceae	SR-T
	Daphnopsis helleriana	Heller's false daphne	Thymelaeaceae	SR-E
	Deeringothamnus pulchellus	slimpetal pawpaw	Annonaceae	UR
	Deeringothamnus rugelii	Rugel's pawpaw	Annonaceae	UR
	Delphinium alabamicum	Alabama larkspur	Ranunculaceae	SR-E
109				
110				

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Delphinium newtonianum	Newton's larkspur	Ranunculaceae	UR
	Delphinium treleasei	Trelease's larkspur	Ranunculaceae	UR
	Dendropemon sintenisii	Sintenis' mistletoe	Loranthaceae	SR-E
	Dentaria incisa	cut toothwort	Brassicaceae	PE
	Desmodium lindheimeri	Lindheimer's tick-treefoil	Fabaceae	UR
62	Dicerandra frutescens	shrubby dicerandra	Lamiaceae	PE
63	Dicerandra immaculata	spotless-petaled dicerandra	Lamiaceae	PE
91	Dicerandra odoratissima	rose dicerandra	Lamiaceae	UR
	Diclipter krugii	Krug's diclipter	Acanthaceae	SR-E
	Digitaria floridana	Florida crabgrass	Poaceae	UR
	Digitaria gracillima	longleaf crabgrass	Poaceae	UR
	Digitaria pauciflora	few-flowered crabgrass	Poaceae	PE
127	Dionaea muscipula	common venus' flytrap	Droseraceae	UR
	Dodecatheon frenchii	French's shooting-star	Primulaceae	UR
166	Draba aprica	open-ground whitlow-grass	Brassicaceae	PE
	Dyschoriste crenulata	wavy-leaved dyschoriste	Acanthaceae	UR
	Dyssodia tephroleuca	ashy dogweed	Asteraceae	PE
118	Echinacea laevigata	smooth purple coneflower	Asteraceae	UR

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
119	Echinacea tennesseensis	Tennessee purple coneflower	Asteraceae	E
	Echinocereus blanckii angusticeps	yellow alicocha hedgehog-cactus	Cactaceae	SR-EX
	Echinocereus chloranthus neocapillus	Texas hedgehog-cactus	Cactaceae	PE
	Echinocereus lloydii	Lloyd's hedgehog-cactus	Cactaceae	PE
	Echinocereus reichenbachii albertii	Reichenbach's purple-spined hedgehog-cactus	Cactaceae	PE
	Echinocereus reichenbachii chisosensis	Reichenbach's Chisos Mountains hedgehog-cactus	Cactaceae	UR
	Echinocereus reichenbachii fitchii	Reichenbach's brownish-spined hedgehog-cactus	Cactaceae	UR
	Echinocereus russanthus	rusty hedgehog-cactus	Cactaceae	PE
	Echinocereus viridiflorus correllii	Correll's green-flowered hedgehog-cactus	Cactaceae	UR
	Echinocereus viridiflorus davisii	Davis' green-flowered hedgehog-cactus	Cactaceae	PE
	Eleocharis austrotexana	southern Texas spike-rush	Cyperaceae	UR
	Eleocharis cylindrica	cylinder spike-rush	Cyperaceae	PE
29	Elliottia racemosa	common southern plume	Ericaceae	PE
	Elodea linearis	Nashville waterweed	Hydrocharitaceae	PE
	Elytraria carolinensis angustifolia	narrow-leaved Carolina scalystem	Acanthaceae	SR-T
	Elytraria carolinensis caroliniensis	Carolina scalystem	Acanthaceae	SR-T

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Encyclia boothiana erythronioides	Booth's dogtooth orchid	Orchidaceae	UR
	Epidendrum brittonianum	Britton's orchid	Orchidaceae	SR-T
	Epidendrum krugii	Krug's orchid	Orchidaceae	SR-E
	Epidendrum lacerum	torn orchid	Orchidaceae	SR-E
	Epidendrum sintenisii	Sintenis' orchid	Orchidaceae	SR-E
	Epithelantha bokei	Boke's button-cactus	Cactaceae	UR
	Eragrostis tracyi	Sanibel love-grass	Poaceae	UR
	Erigeron bigelovii	Bigelow's fleabane	Asteraceae	UR
	Erigeron geiseri calicola	limestone fleabane	Asteraceae	PE
31	Eriocaulon kornickianum	small-headed pipewort	Eriocaulaceae	PE
	Eriochloa michauxii simpsonii	Simpson's cup-grass	Poaceae	UR
	Eriogonum correllii	Correll's wild-buckwheat	Polygonaceae	UR
187	Eriogonum longifolium harperi	Harper's long-leaved wild-buckwheat	Polygonaceae	PE
	Eriogonum nealleyi	Irion county wild-buckwheat	Polygonaceae	PE
	Eriogonum suffruticosum	bushy wild-buckwheat	Polygonaceae	PE
	Erithalis revoluta	Puerto Rico erithalis	Rubiaceae	SR-E
111	Eryngium cunefolium	wedge-leaved button-snake roots	Apiaceae	UR
	Eugenia haematocarpa	red-pistilled eugenia	Myrtaceae	SR-T

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Eugenia margarettae	Margaret's eugenia	Myrtaceae	SR-E
	Eugenia underwoodii	Underwood's eugenia	Myrtaceae	SR-E
	Eupatorium borinquense	Puerto Rico thoroughwort	Asteraceae	SR-T
	Eupatorium droseroilepis	oreganillo thoroughwort	Asteraceae	SR-E
	Eupatorium oteroi	Mona Island thoroughwort	Asteraceae	SR-T
	Eupatorium resinosum kentuckiense	Kentucky resin boneset	Asteraceae	PE
	Eupatorium saltuense	pasture thoroughwort	Asteraceae	UR
	Euphorbia austrina	pineland spurge	Euphorbiaceae	UR
	Euphorbia discoidalis	Apalachicola spurge	Euphorbiaceae	UR
	Euphorbia exserta	exserted-fruited spurge	Euphorbiaceae	UR
	Euphorbia fendleri triligulata	Fendler's suffrutescent spurge	Euphorbiaceae	PE
	Euphorbia garberi	Garber's spurge	Euphorbiaceae	PE
	Euphorbia golondrina	boquillas spruge	Euphorbiaceae	PE
	Euphorbia innocua	velvet spurge	Euphorbiaceae	UR
	Euphorbia jejuna	dwarf spurge	Euphorbiaceae	UR
	Euphorbia perennans	perennial spurge	Euphorbiaceae	UR
	Euphorbia roemeriana	roemer spurge	Euphorbiaceae	UR
	Euphorbia strictior	pandhandle spurge	Euphorbiaceae	UR

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
32	Euphorbia telephoides	telephus spruge	Euphorbiaceae	UR
	Eurytaenia hinckleyi	Hinckley's spread-wing	Apiaceae	UR
	Festuca ligulata	Guadalupe fescue	Poaceae	UR
28	Fimbristylis perpusilla	Vahl's fimbry	Cyperaceae	PE
	Forestiera segregata	pinewood privet	Oleaceae	PE
81	Fothergilla gardenii	dwarf witch-alder	Hamamelidaceae	UR
	Frankenia johnstonii	Johnston's frankenia	Frankeniaceae	PE
	Franklinia alatomahala	Georgia franklin-tree	Theaceae	PE
	Frasera coloradensis	Colorado gentian	Gentianaceae	SR-T
	Galactia eggersii	Egger's milkpea	Fabaceae	SR-T
	Galactia pinetorum	Small's milkpea	Fabaceae	PE
	Galium correllii	cliff bedstraw	Rubiaceae	UR
	Gaura demareei	Demaree's gaura	Onagraceae	SR-T
	Gaya violaceae	violet gaya	Malvaceae	PE
	Genistidium dumosum	Johnston brush-pea	Fabaceae	PE
	Gentiana deloachii	DeLoach's gentian	Gentianaceae	PE
59	Gentiana pennelliana	wiregrass gentian	Gentianaceae	PE
	Geocarpum minimum	little geocarpon	Caryophyllaceae	PE

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Gesneria pauciflora	few-flowered gesneria	Gesneriaceae	SR-E
	Geum geniculatum	bent avens	Rosaceae	PE
193	Geum radiatum	spreading avens	Rosaceae	PE
185	Glyceria nubigena	Smoky Mountain manna-grass	Poaceae	PE
	Goetzea elegans	beautiful goetzea	Solanaceae	SR-E
	Grammitis nimbata	frivolous grammitis	Polypodiaceae	PE
	Grindelia oolepis	plains gum-weed	Asteraceae	PE
	Gymnopogon floridanus	Florida beardgrass	Poaceae	UR
134	Harperocallis flava	yellow-petaled Harper's beauty	Liliaceae	PE
	Harrisia portoricensis	Puerto Rico moon cactus	Cactaceae	SR-E
68	Hartwrightia floridana	Florida hartwrightia	Asteraceae	UR
	Hechtia texensis	Texas false-agave	Bromeliaceae	PE
	Hedeoma apiculatum	McKittrick pennyroyal	Lamiaceae	UR
64	Hedeoma graveolens	mock pennyroyal	Lamiaceae	PE
	Hedeoma pilosum	old blue pennyroyal	Lamiaceae	PE
195	Hedyotis nigricans pulvinata	mat-forming narrow-leaved bluet	Rubiaceae	PE
	Hedyotis purpurea montana	mountain purple bluet	Rubiaceae	SR-T
	Heimia longipes	stalk-flower heimia	Lythraceae	UR

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
120	Helianthus carnosus	lake-side sunflower	Asteraceae	UR
	Helianthus debilis vestitus	hairy cucumber-leaf sunflower	Asteraceae	UR
	Helianthus paradoxus	puzzle sunflower	Asteraceae	PE
	Helianthus praecox hirtus	hairy Texas sunflower	Asteraceae	UR
	Helianthus schweinitzii	Schweinitz's sunflower	Asteraceae	UR
164	Helianthus smithii	Smith's sunflower	Asteraceae	UR
	Heliotropium guanicense	tropical-island turnsole	Boraginaceae	SR-E
	Heliotropium polyphyllum horizontale	prostrate many-leaved turnsole	Boraginaceae	UR
70	Heterotheca flexuosa	bent golden-aster	Asteraceae	UR
	Heterotheca ruthii	Ruth's telegraph plant	Asteraceae	PE
	Heuchera arkansana	Arkansas alumroot	Saxifragaceae	UR
	Heuchera hispida	rough alumroot	Saxifragaceae	UR
	Hexalectris grandiflora	Greenman's coral-root	Orchidaceae	UR
	Hexalectris nitida	Glass Mountain coral-root	Orchidaceae	UR
	Hexalectris revoluta	Chisos coral-root	Orchidaceae	UR
	Hexastylis contracta	southern heartleaf	Aristolochiaceae	SR-T
	Hexastylis lewisii	Lewis' heartleaf	Aristolochiaceae	UR
159	Hexastylis naniflora	dwarf-flowered heartleaf	Aristolochiaceae	PE

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
116	Hexastylis speciosa	Harper's heartleaf	Aristolochiaceae	PE
	Hibiscus dasycalyx	Neches river rose-mallow	Malvaceae	PE
	Hoffmannseggia tenella	slender rush-pea	Fabaceae	PE
167	Hudsonia ericoides montana	golden mountain heather	Cistaceae	PE
	Hydrastis canadensis	common golden seal	Ranunculaceae	SR-T
135	Hymenocallis coronaria	stream-bank spiderlily	Liliaceae	PE
	Hymenocallis latifolia	broad-leaved spiderlily	Liliaceae	UR
	Hymenoxys texana	Texas bitterweed	Asteraceae	PE
83	Hypericum cumulicola	highlands scrub hypericum	Hypericaceae	PE
84	Hypericum edsonianum	Edison's St. John's-wort	Hypericaceae	UR
	Hypericum sphaerocarpum turgidum	turgid round-fruited St. John's wort	Hypericaceae	UR
	Hypoxis longii	Long's yellow star-grass	Amaryllidaceae	PE
114	Ilex amelanchier	serviceberry holly	Aquifoliaceae	UR
	Ilex cookii	te holly	Aquifoliaceae	SR-E
115	Ilex opaca arenicola	sand-loving American holly	Aquifoliaceae	UR
67	Iliamna remota	Kankakee globe-mallow	Malvaceae	PE
144	Illicium parviflorum	yellow anisetree	Magnoliaceae	UR
	Ipomoea cardiophylla	Trans-Pecos Mtn. morning glory	Convolvulaceae	UR

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	<i>Ipomoea krugii</i>	white morning glory	Convolvulaceae	SR-E
	<i>Isoetes flaccida</i>	Florida quillwort	Isoetaceae	UR
	<i>Isoetes lithophylla</i>	rock quillwort	Isoetaceae	PE
174	<i>Isoetes louisianensis</i>	Louisiana quillwort	Isoetaceae	PE
	<i>Isoetes melanospora</i>	black-spored quillwort	Isoetaceae	UR
	<i>Isoetes virginica</i>	Virginia quillwort	Isoetaceae	UR
	<i>Isotria medeoloides</i>	small-whorled pogonia	Orchidaceae	PE
	<i>Jacquemontia curtissii</i>	Curtiss' clustervine	Convolvulaceae	UR
	<i>Jacquemontia reclinata</i>	reclined clustervine	Convolvulaceae	UR
	<i>Jacquinia umbellata</i>	Puerto Rico Jacquinia	Theophrastaceae	SR-E
121	<i>Jamesianthus alabamensis</i>	Alabama Jamesianthus	Asteraceae	PE
	<i>Juncus caesariensis</i>	New Jersey rush	Juncaceae	UR
87	<i>Juncus gymnocarpus</i>	Coville's rush	Juncaceae	UR
	<i>Justicia borinquensis</i>	Puerto Rico water-willow	Acanthaceae	SR-E
106	<i>Justicia cooleyi</i>	Cooley's water-willow	Acanthaceae	PE
107	<i>Justicia crassifolia</i>	thick-leaved water-willow	Acanthaceae	PE
	<i>Justicia culebritae</i>	Culebra Island water-willow	Acanthaceae	SR-E
	<i>Justicia mortuifluminis</i>	dead water water-willow	Acanthaceae	UR

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Justicia runyonii	Runyon's water-willow	Acanthaceae	UR
	Justicia warnockii	Warnock's water-willow	Acanthaceae	UR
	Justicia wrightii	Wright's water-willow	Acanthaceae	UR
171	Kalmia cuneata	white-wicky laurel	Ericaceae	PE
	Kosteletzkya smilacifolia	southern sea-shore mallow	Malvaceae	UR
30	Lachnoncaulon beyrichianum	southern bog buttons	Eriocaulaceae	UR
	Laplacea portoricensis	Puerto Rico laplacea	Theaceae	SR-T
10	Leavenworthia alabamica alabamica	Alabama glade-cress	Brassicaceae	UR
11	Leavenworthia alabamica brachystyla	short-styled glade-cress	Brassicaceae	PE
	Leavenworthia aurea	golden glade-cress	Brassicaceae	PE
12	Leavenworthia crassa crassa	fleshy-fruited glade-cress	Brassicaceae	PE
13	Leavenworthia crassa elongata	Falkville glade-cress	Brassicaceae	PE
14	Leavenworthia exigua exigua	Tennessee glade-cress	Brassicaceae	UR
15	Leavenworthia exigua laciniata	Sheperdsville glade-cress	Brassicaceae	PE
16	Leavenworthia exigua lutea	pasture glade-cress	Brassicaceae	PE
17	Leavenworthia stylosa	Limestone glade-cress	Brassicaceae	UR
18	Leavenworthia torulosa	string-of-beads glade-cress	Brassicaceae	UR
20	Lechea cernua	nodding pinweed	Cistaceae	UR

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
21	<i>Lechea divaricata</i>	pine pinweed	Cistaceae	UR
	<i>Lechea lakelae</i>	Lakela's pinweed	Cistaceae	SR-T
168	<i>Lechea maritima virginica</i>	Virginian pinweed	Cistaceae	PE
	<i>Lechea mensalis</i>	Chisos Mountain pinweed	Cistaceae	PE
	<i>Leitneria floridana</i>	Florida corkwood	Leitneriaceae	SR-T
	<i>Lepanthes dodiana</i>	montane lepanthes	Orchidaceae	SR-E
	<i>Lepanthes eltoroensis</i>	Lequillo Mountain lepanthes	Orchidaceae	SR-E
	<i>Lepanthopsis melanantha</i>	Harris' lepanthes orchid	Orchidaceae	UR
	<i>Leptocereus quadricostatus</i>	four ribbed cereus	Cactaceae	SR-T
	<i>Lesquerella angustifolia</i>	thread-leaved bladderpod	Brassicaceae	UR
1	<i>Lesquerella densipila</i>	Duck River bladderpod	Brassicaceae	PE
42	<i>Lesquerella globosa</i>	globose bladderpod	Brassicaceae	UR
43	<i>Lesquerella lescurii</i>	Nashville bladderpod	Brassicaceae	SR-T
44	<i>Lesquerella lyrata</i>	lyrate bladderpod	Brassicaceae	PE
	<i>Lesquerella mcvaughiana</i>	McVaugh's bladderpod	Brassicaceae	UR
45	<i>Lesquerella perforata</i>	Spring Creek bladderpod	Brassicaceae	PE
46	<i>Lesquerella stonensis</i>	Stone's river bladderpod	Brassicaceae	PE
	<i>Lesquerella thamnophila</i>	Zapata county bladderpod	Brassicaceae	UR
	<i>Lesquerella valida</i>	strong bladderpod	Brassicaceae	PE

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	<i>Liatris cymosa</i>	branched gay-feather	Asteraceae	UR
	<i>Liatris helleri</i>	Heller's gay-feather	Asteraceae	UR
122	<i>Liatris ohlingerae</i>	Florida gay-feather	Asteraceae	PE
123	<i>Liatris provincialis</i>	Godfrey's gay-feather	Asteraceae	PE
	<i>Liatris tenuis</i>	slender gay-feather	Asteraceae	UR
	<i>Lilaeopsis carolinensis</i>	Carolina lilaeopsis	Apiaceae	SR-T
136	<i>Lilium grayii</i>	Gray's lily	Liliaceae	UR
137	<i>Lilium iridollae</i>	panhandle lily	Liliaceae	PE
	<i>Limonium carolinianum angustatum</i>	narrow-leaved sea-lavender	Plumbaginaceae	PE
	<i>Limonium limbatum</i>	alkaline-flat sea-lavender	Plumbaginaceae	UR
99	<i>Lindera melissifolium</i>	swamp spicebush	Lauraceae	UR
	<i>Lindernia saxicola</i>	Carolina pimpernel	Scrophulariaceae	PE
	<i>Linum arenicola</i>	sand flax	Linaceae	PE
	<i>Linum carteri carteri</i>	Carter's small-flowered flax	Linaceae	PE
179	<i>Linum carteri smallii</i>	Carter's large-flowered flax	Linaceae	PE
	<i>Linum macrocarpum</i>	Mobile flax	Linaceae	PE
	<i>Linum sulcatum harper</i>	Harper's grooved-yellow flax	Linaceae	UR
66	<i>Linum westii</i>	West's flax	Linaceae	PE

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
101	Litsea aestivalis	pond-spice	Lauraceae	UR
	Lobelia gattingeri	Gattinger's lobelia	Campanulaceae	SR-T
131	Lupinus westianus	panhandle lupine	Fabaceae	UR
	Lycium berberioides	silvery wolf-berry	Solanaceae	UR
	Lycium texanum	Texas wolf-berry	Solanaceae	UR
	Lycopodium portoricensis	Puerto Rico clubmoss	Lycopodiaceae	SR-E
	Lysimachia asperulaefolia	Carolina loosestrife	Primulaceae	SR-T
	Lythrum curtissii	Curtiss' lythrum	Lythraceae	UR
	Lythrum flagellare	lowland lythrum	Lythraceae	UR
	Lythrum ovalifolium	oval-leaved lythrum	Lythraceae	UR
65	Macbridea alba	white birds-in-a-nest	Lamiaceae	PE
	Machaeranthera aurea	Houston aster	Asteraceae	PE
	Magnolia ashei	Ashe magnolia	Magnoliaceae	UR
	Malpighia pallens	pale malpighia	Malpighiaceae	SR-E
	Manihot walkerae	Walker's manihot	Euphorbiaceae	PE
	Manisuris tuberculosa	piedmont joint-grass	Poaceae	UR
	Marlierea sintenisii	Sintenis' marlierea	Myrtaceae	SR-T
	Marsdenia elliptica	elliptic leaved condorvine	Asclepiadaceae	SR-E

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
124	Marshallia mohrii	Mohr's barbara's-buttons	Asteraceae	PE
38	Marshallia ramosa	southern barbara's-buttons	Asteraceae	UR
160	Matelea alabamensis	Alabama milkvine	Asclepiadaceae	PE
	Matelea brevicoronata	short-corona milkvine	Asclepiadaceae	UR
	Matelea edwardsensis	plateau milkvine	Asclepiadaceae	PE
	Matelea floridana	Florida milkvine	Asclepiadaceae	UR
	Matelea radiata	falfurrias milkvine	Asclepiadaceae	PE
	Matelea texensis	Trans-Pecos milkvine	Asclepiadaceae	PE
	Maytenus cymosa	Caribbean mayten	Celastraceae	SR-T
	Maytenus elongata	Puerto Rico mayten	Celastraceae	SR-T
	Maytenus ponceana	Ponce mayten	Celastraceae	SR-T
	Melanthera parvifolia	small-leaved melanthera	Asteraceae	UR
	Micranthemum micranthemoides	Nuttall's mud-flower	Scrophulariaceae	UR
	Mikania stevensiana	Steven's hempweed	Asteraceae	SR-E
	Minuartia uniflora	one-flowered sandwort	Caryophyllaceae	SR-T
	Mitracarpus maxwelliae	Maxwell's mitracarpus	Rubiaceae	SR-E
	Mitracarpus polycladus	Guanica mitracarpus	Rubiaceae	SR-E
	Monarda stipitatoglandulosa	stiped-gland bee-balm	Lamiaceae	UR

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Monotropa brittonii	Britton's pinesap	Ericaceae	SR-T
	Monotropis reynoldsiae	Reynold's sweet pinesap	Ericaceae	PE
	Muhlenbergia torreyana	Torrey's muhly	Poaceae	UR
	Muhlenbergia villosa	hairy muhly	Poaceae	PE
	Myrcia paganii	Puerto Rico waxmyrtle	Myrtaceae	SR-T
	Myrcianthes fragrans simpsonii	Simpson's stopper	Myrtaceae	UR
80	Myriophyllum laxum	piedmont water-milfoil	Haloragaceae	UR
	Nama xylopodum	yellowseed fiddleleaf	Hydrophyllaceae	UR
85	Nemastylis floridana	fall-flowering pleatleaf	Iridaceae	UR
	Neolloydia gautii	Gaut's butterfly	Cactaceae	PE
	Neolloydia mariposensis	terlingua butterfly	Cactaceae	PE
	Neolloydia warnockii	Warnock's butterfly	Cactaceae	UR
	Nephropetalum pringlei	Pringle's kidneypetal	Sterculiaceae	PE
	Nestronia umbellula	common nestronia	Santalaceae	UR
	Neviusia alabamensis	Alabama snow-wreath	Rosaceae	UR
	Nolina arenicola	sand beargrass	Liliaceae	SR-T
138	Nolina atopocarpa	Florida beargrass	Liliaceae	PE
139	Nolina brittoniana	Britton's beargrass	Liliaceae	PE

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Notholaena schaffneri nealleyi	Nealley's cloak-fern	Polypodiaceae	UR
	Nuphar luteum ulvaceum	west Florida cowlily	Nymphaeaceae	UR
	Oenothera sessilis	coastal evening-primrose	Onagraceae	PE
	Onosmodium helleri	Heller's false-gromwell	Boraginaceae	UR
	Onosmodium molle	soft-hairy false-gromwell	Boraginaceae	SR-T
	Operculina triquetra	triangular-leaved jolap	Convolvulaceae	SR-E
	Ophioglossum dendroneuron	Florida adder's-tongue fern	Ophioglossaceae	UR
207	Ophioglossum palmatum	hand adder's-tongue fern	Ophioglossaceae	UR
	Opuntia arenaria	sand prickly-pear	Cactaceae	UR
	Opuntia borinquensis	olaga prickly pear	Cactaceae	SR-E
	Opuntia imbricata aregentea	silvery tree cactus	Cactaceae	UR
	Opuntia spinosissima	semaphore cactus	Cactaceae	UR
	Opuntia strigil flexospina	flexible-spined marble-fruit prickly-pear	Cactaceae	PE
	Opuntia triacantha	three-spined prickly-pear	Cactaceae	UR
	Ostrya chisosensis	Big Bend hop hornbeam	Betulaceae	UR
	Ottoschulzia rhodoxylon	rosewood ottoschulzia	Icacinaeae	SR-E
	Oxypolis canbyi	Canby's cowbane	Apiaceae	UR

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
112	<i>Oxypolis greenmanii</i>	giant water cowbane	Apiaceae	PE
	<i>Panax quinquefolius</i>	wild ginseng	Araliaceae	UR
	<i>Panicum aculeatum</i>	tall rough panic-grass	Poaceae	UR
	<i>Panicum hirstii</i>	Hirst's panic-grass	Poaceae	PE
	<i>Panicum lithophilum</i>	Swallen's panic-grass	Poaceae	UR
	<i>Panicum mundum</i>	Fernald's panic-grass	Poaceae	PE
	<i>Panicum nudicaule</i>	naked-stemmed panic-grass	Poaceae	UR
	<i>Panicum pinetorum</i>	pineland panic-grass	Poaceae	UR
	<i>Panicum stevensianum</i>	Steven's panic-grass	Poaceae	SR-E
74	<i>Paronychia chartacea</i>	paperlike nail-wort	Caryophyllaceae	PE
	<i>Paronychia chorizanthoides</i>	chalk nail-wort	Caryophyllaceae	UR
	<i>Paronychia congesta</i>	bushy nail-wort	Caryophyllaceae	PE
	<i>Paronychia drummondii parviflora</i>	Drummond's small-flowered nail-wort	Caryophyllaceae	UR
	<i>Paronychia maccartii</i>	Laredo nail-wort	Caryophyllaceae	PE
	<i>Paronychia monticola</i>	Livermore's nail-wort	Caryophyllaceae	SR-T
	<i>Paronychia nudata</i>	naked nail-wort	Caryophyllaceae	UR
	<i>Paronychia rugelii interior</i>	Rugel's interior nail-wort	Caryophyllaceae	PE
	<i>Paronychia virginica parksii</i>	Park's nail-wort	Caryophyllaceae	UR

September 1979

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	<i>Paronychia wilkinsonii</i>	Wilkinson's nail-wort	Caryophyllaceae	UR
	<i>Penstemon cobaea purpureus</i>	cobaea purple beardtongue	Scrophulariaceae	UR
	<i>Penstemon dissectus</i>	dissected beardtongue	Scrophulariaceae	UR
	<i>Penstemon multicaulis</i>	many-stemmed beardtongue	Scrophulariaceae	UR
	<i>Peperomia wheeleri</i>	Wheeler's peperomia	Piperaceae	SR-E
	<i>Perityle bisetosa bisetosa</i>	Cox Ranch two-spiked rock-daisy	Asteraceae	PE
	<i>Perityle bisetosa scalaris</i>	Stair-Step Mtn. two-spiked rock-daisy	Asteraceae	PE
	<i>Perityle cinerea</i>	gray rock-daisy	Asteraceae	PE
	<i>Perityle lindheimeri halmifolia</i>	Lindheimer's halimus-leaved rock-daisy	Asteraceae	PE
	<i>Perityle rotundata</i>	Presidio county rock-daisy	Asteraceae	PE
	<i>Perityle vitreomontana</i>	Glass Mountain rock-daisy	Asteraceae	PE
	<i>Perityle warnockii</i>	river rock-daisy	Asteraceae	UR
100	<i>Persea borbonia humilis</i>	dwarf red bay perseae	Lauraceae	UR
	<i>Persicaria paludicola</i>	Everglades knotweed	Polygonaceae	UR
35	<i>Petalostemum foliosum</i>	leafy prairie-clover	Fabaceae	PE
	<i>Petalostemum gattingeri</i>	Gattinger's prairie-clover	Fabaceae	SR-T
	<i>Petalostemum reverchonii</i>	Comanche Peak prairie-clover	Fabaceae	PE

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	<i>Petalostemum sabinale</i>	Sabinal prairie-clover	Fabaceae	PE
82	<i>Phacelia dubia georgiana</i>	Georgia small-flowered phacelia	Hydrophyllaceae	UR
	<i>Phacelia integrifolia texana</i>	Texas gyp phacelia	Hydrophyllaceae	UR
	<i>Phacelia pallida</i>	pale phacelia	Hydrophyllaceae	PE
	<i>Philadelphus ernestii</i>	canyon mock-orange	Saxifragaceae	UR
	<i>Philadelphus texensis texensis</i>	Texas mock-orange	Saxifragaceae	UR
	<i>Phlox bifida stellaria</i>	starwort cleft phlox	Polemoniaceae	UR
	<i>Phlox longipilosa</i>	long-haired phlox	Polemoniaceae	SR-E
	<i>Phlox nivalis texensis</i>	Texas trailing phlox	Polemoniaceae	PE
	<i>Phlox oklahomensis</i>	Oklahoma phlox	Polemoniaceae	SR-T
147	<i>Phlox pulchra</i>	Wherry's phlox	Polemoniaceae	PE
	<i>Phyllanthus ericoides</i>	heather leaf-flower	Euphorbiaceae	PE
54	<i>Phyllanthus liebmannianus</i>	Florida leaf-flower	Euphorbiaceae	UR
	<i>Phyllanthus pentaphyllus floridanus</i>	Florida five-petaled leaf flower	Euphorbiaceae	UR
162	<i>Phyllitis scolopendrium americana</i>	American hart's-tongue fern	Polypodiaceae	PE
	<i>Physalis viscosa elliotii</i>	Elliot's sticky ground cherry	Solanaceae	SR-T
	<i>Physostegia correllii</i>	Correll's dragon-head	Lamiaceae	PE
	<i>Physostegia leptophyllum</i>	slender-leaved dragon-head	Lamiaceae	UR

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Physostegia micrantha	Heart Creek dragon-head	Lamiaceae	UR
92	Physostegia veroniciformis	Veronica dragon-head	Lamiaceae	UR
	Pieris phillyreaefolia	climbing fetter-bush	Ericaceae	UR
	Pilea leptophylla	thin-leaved clearweed	Urticaceae	SR-E
	Pilea multicaulis	many-stemmed clearweed	Urticaceae	SR-E
	Pilea richardii	Richard's clearweed	Urticaceae	SR-E
	Pilea yunquensis	El Yunque Peak clearweed	Urticaceae	SR-T
	Pinckneya pubens	hairy fever-tree	Rubiaceae	UR
132	Pinguicula ionantha	violet-flowered butterwort	Lentibulariaceae	PE
133	Pinguicula planifolia	Chapman's butterwort	Lentibulariaceae	UR
182	Plantago cordata	heart-leaved plantain	Plantaginaceae	PE
	Platanthera flava	southern rein-orchid	Orchidaceae	UR
	Platanthera integra	yellow fringeless orchid	Orchidaceae	UR
	Platanthera leucophaea	prairie white-fringed orchid	Orchidaceae	UR
	Platanthera peramoena	purple fringeless orchid	Orchidaceae	UR
	Pleodendron macranthum	large-flowered pleodendron	Canellaceae	SR-T
	Poa involuta	Big Bend bluegrass	Poaceae	PE
	Polemonium pauciflorum hinckleyi	Hinckley's few-flowered polemonium	Polemoniaceae	PE

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Polemonium reptans villosum	softly-haired creeping polemonium	Polemoniaceae	UR
	Polianthes maculosa	spotted aloe	Liliaceae	UR
	Polianthes runyonii	Runyon's aloe	Liliaceae	PE
	Polygala boykinii sparsifolia	Boykin's few-leaved milkwort	Polygalaceae	UR
	Polygala cowellii	violet-tree milkwort	Polygalaceae	SR-T
186	Polygala lewtonii	Lewton's milkwort	Polygalaceae	PE
	Polygala maravillasensis	Maravillas milkwort	Polygalaceae	PE
	Polygala rimulicola	Steyermark's milkwort	Polygalaceae	PE
148	Polygonella ciliata basiramea	hairy jointweed	Polygonaceae	PE
149	Polygonella macrophylla	large-leaved jointweed	Polygonaceae	UR
150	Polygonella myriophylla	Small's jointweed	Polygonaceae	PE
	Polygonella parksii	Park's jointweed	Polygonaceae	PE
	Polygonum striatulum	Kleberg knotweed	Polygonaceae	UR
	Polygonum texense	Texas knotweed	Polygonaceae	PE
	Populus hinckleyana	Goat Canyon cottonwood	Salicaceae	PE
	Porophyllum greggii	Gregg's pore-leaf	Asteraceae	UR
	Portulaca caulerpoides	Puerto Rico purslane	Portulacaceae	SR-T
	Portulaca smallii	Small's purslane	Portulacaceae	PE

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
4	Potamogeton clystocarpus	Fernald's pondweed	Potamogetonaceae	PE
	Prenanthes roanensis	piedmont rattlesnake-root	Asteraceae	UR
	Priva portoricensis	Puerto Rico velvetbur	Verbenaceae	SR-E
	Proboscidea sabulosa	dune unicorn-plant	Pedaliaceae	UR
194	Prunus geniculata	scrub plum	Rosaceae	PE
	Prunus havardii	Harvard plum	Rosaceae	UR
	Prunus minutiflora	Texas almond	Rosaceae	UR
	Prunus murrayana	Murray plum	Rosaceae	UR
	Prunus texana	Texas peach-bush	Rosaceae	UR
	Psidium sintenisii	Sintenis' guava	Myrtaceae	SR-T
	Psoralea macrophylla	Polk county scarf-pea	Fabaceae	PE
	Psoralea-subacaulis	southern scarf-pea	Fabaceae	SR-T
113	Ptilimnium fluviatilis	river bishop-weed	Apiaceae	UR
	Ptilimnium nodosum	piedmont bishop-weed	Apiaceae	UR
175	Pycnanthemum curvipes	Tennessee mountain-mint	Lamiaceae	PE
	Pycnanthemum floridanum	Florida mountain-mint	Lamiaceae	UR
93	Pycnanthemum monotrichum	single-haired mountain-mint	Lamiaceae	UR
	Pyxidanthera brevifolia	Well's pixie-moss	Diapensiaceae	PE

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
78	Quercus georgiana	Georgia oak	Fagaceae	UR
	Quercus graciliformis	slender oak	Fagaceae	PE
	Quercus hinckleyi	Hinckley's oak	Fagaceae	PE
36	Quercus oglethorpensis	Oglethorpe's oak	Fagaceae	UR
79	Quercus shumardii acerifolia	maple leaf Shumard's oak	Fagaceae	UR
	Quercus tardifolia	Chizos Mountains oak	Fagaceae	PE
	Ranunculus subcordatus	heart-leaved buttercup	Ranunculaceae	UR
	Ravenia urbanii	Urban ravenia	Rutaceae	SR-T
206	Rhapidophyllum hystrix	common needle-palm	Arecaceae	UR
145	Rhexia parviflora	small-flowered meadowbeauty	Melastomataceae	PE
	Rhexia salicifolia	panhandle meadowbeauty	Melastomaceae	UR
75	Rhododendron austrinum	Florida azalea	Ericaceae	UR
	Rhododendron bakeri	Cumberland azalea	Ericaceae	UR
128	Rhododendron minus chapmanii	Chapman's rhododendron	Ericaceae	E
129	Rhododendron prunifolium	plumleaf azalea	Ericaceae	UR
	Rhododendron vaseyi	pink-shell azalea	Ericaceae	UR
	Rhus michauxii	false poison sumac	Anacardiaceae	SR-T
76	Rhynchosia cinerea	brown-haired snoutbean	Fabaceae	UR

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
169	Rhynchospora crinipes	Alabama beaked-rush	Cyperaceae	PE
	Rhynchospora culixa	Georgia beaked-rush	Cyperaceae	UR
	Rhynchospora globularis saxicola	rock-loving globe beaked-rush	Cyperaceae	UR
	Rhynchospora punctata	pineland beaked-rush	Cyperaceae	UR
199	Ribes echinellum	Florida gooseberry	Saxifragaceae	PE
	Rosa stellata	desert rose	Rosaceae	UR
	Roystonea elata	Florida royal-palm	Areaceae	PE
	Rubus duplaris	Shinner's blackberry	Rosaceae	PE
5	Rudbeckia auriculata	eared coneflower	Asteraceae	UR
6	Rudbeckia heliopsidis	sun-facing coneflower	Asteraceae	UR
	Rudbeckia triloba pinnatiloba	pinnate-lobed brown-eyed coneflower	Asteraceae	UR
	Ruellia drummondiana	Drummond's petunia	Acanthaceae	UR
	Rumex spiralis	winged dock	Polygonaceae	UR
	Ruppia anomala	aquatic widgeonweed	Zannichelliaceae	SR-E
	Sageretia minutifolia	tiny-leaved buckthorn	Rhamnaceae	SR-T
157	Sagittaria fasciculata	bunched arrowhead	Alismataceae	E
196	Salix floridana	Florida willow	Salicaceae	PE

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Salvia blodgettii	Blodgett's sage	Lamiaceae	PE
	Salvia penstemonoides	big red sage	Lamiaceae	UR
197	Sarracenia alabamensis alabamensis	Alabama cane-break pitcher-plant	Sarraceniaceae	PE
	Sarracenia alabamensis wherryi	Wherry's cane-break pitcher-plant	Sarraceniaceae	SR-E
	Sarracenia jonesii	Jones' pitcher-plant	Sarraceniaceae	SR-E
198	Sarracenia oreophila	green pitcher-plant	Sarraceniaceae	PE
205	Sarracenia psittacina	parrot pitcher-plant	Sarraceniaceae	UR
	Sarracenia rubra	sweet pitcher-plant	Sarraceniaceae	UR
	Saxifraga careyana	golden-eye saxifrage	Saxifragaceae	UR
	Saxifraga caroliniana	Carolina saxifrage	Saxifragaceae	UR
37	Schisandra glabra	smooth magnolia-vine	Schisandraceae	UR
	Schizachyrium niveum	riparium autumgrass	Poaceae	UR
	Schizachyrium rhizomatum	Florida autumgrass	Poaceae	PE
	Schizaea germanii	tropical curly grass fern	Schizaeaceae	PE
176	Schoenolirion wrightii	Texas sunnysbell	Liliaceae	PE
	Schoepfia arenaria	sand graytwig	Oleaceae	SR-E
	Schrankia portoricensis	Puerto Rico sensitive-briar	Fabaceae	SR-E
	Schwalbea americana	American chaff-seed	Scrophulariaceae	SR-T

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Scirpus ancistrochaetus	northeastern bullrush	Cyperaceae	SR-E
	Scirpus flaccidifolius	reclining bullrush	Cyperaceae	UR
	Scirpus longii	Bayard Long's bullrush	Cyperaceae	UR
	Scleria doradoensis	Dorado nutrush	Cyperaceae	SR-E
94	Scutellaria floridana	Florida skullcap	Lamiaceae	UR
95	Scutellaria montana	large-flowered skullcap	Lamiaceae	UR
	Scutellaria ocmulgee	Macon skullcap	Lamiaceae	PE
96	Scutellaria thieretii	Thieretii skullcap	Lamiaceae	UR
50	Sedum nevii	Nevius' stonecrop	Crassulaceae	PE
51	Sedum pusillum	granite rock stonecrop	Crassulaceae	UR
	Sedum robertsonianum	Robert's stonecrop	Crassulaceae	UR
	Sedum texanum	Texas stonecrop	Crassulaceae	PE
	Selenia jonesii	Jone's selenia	Brassicaceae	PE
	Senecio millefolium	piedmont ragwort	Asteraceae	UR
	Senecio warnockii	Warnock's ragwort	Asteraceae	UR
	Sesuvium trianthemoides	Texas sea purslane	Aizoaceae	PE
	Seymeria harvardii	Eagle Pass seymeria	Scrophulariaceae	PE
170	Shortia galacifolia brevistyla	short-styled Oconee bells	Diapensiaceae	PE

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
170	Shortia galacifolia galacifolia	milky-leaved Oconee bells	Diapensiaceae	PE
	Sida eggersii	Egger's sida	Malvaceae	SR-E
	Sida rubromarginata	red-margined sida	Malvaceae	UR
	Silene plankii	Plank's catchfly	Caryophyllaceae	PE
126	Silene polypetala	fringed campion	Caryophyllaceae	PE
71	Silphium brachiatum	cumberland rosinweed	Asteraceae	PE
7	Silphium confertifolium	southern rosinweed	Asteraceae	UR
39	Silphium integrifolium gattingeri	Gattinger's entire-leaved rosinweed	Asteraceae	PE
158	Sium floridanum	Florida water-parsnip	Apiaceae	PE
	Smilax leptanthera	piedmont greenbrier	Liliaceae	UR
	Solanum bahamense rugelii	Rugel's bahama horse-nettle	Solanaceae	PE
	Solanum carolinense hirsutum	stiff-haired carolina horse-nettle	Solanaceae	PE
	Solanum conocarpum	Virgin Island horse-nettle	Solanaceae	SR-E
	Solanum drymophilum	arborescent horse-nettle	Solanaceae	SR-T
	Solanum mucronatum	Caribbean horse-nettle	Solanaceae	SR-E
	Solanum woodburyi	Woodbury's nightshade	Solanaceae	SR-E
125	Solidago albopilosa	white-haired goldenrod	Asteraceae	PE
	Solidago mollis angustata	Plains county ground goldenrod	Asteraceae	UR

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	<i>Solidago porteri</i>	Porter's goldenrod	Asteraceae	PE
	<i>Solidago pulchra</i>	wand-like goldenrod	Asteraceae	SR-T
40	<i>Solidago shortii</i>	Short's goldenrod	Asteraceae	PE
	<i>Solidago spithameae</i>	Blue Ridge goldenrod	Asteraceae	UR
	<i>Solidago verna</i>	spring goldenrod	Asteraceae	SR-T
	<i>Sophora gypsophila guadalupensis</i>	Guadalupe Mountains sophora	Fabaceae	UR
86	<i>Sphenostigma coelestina</i>	Bartram's ixia	Iridaceae	UR
180	<i>Spigelia gentianoides</i>	gentian pinkroot	Loganiaceae	PE
181	<i>Spigelia loganioides</i>	Florida pinkroot	Loganiaceae	PE
	<i>Spigelia texana</i>	Texas pinkroot	Loganiaceae	UR
	<i>Spiranthes lanceolata paludicola</i>	red-flowered ladies'-tresses	Orchidaceae	PE
	<i>Spiranthes parksii</i>	Narasot ladies'-tresses	Orchidaceae	PE
	<i>Spiranthes polyantha</i>	Florida Key ladies'-tresses	Orchidaceae	UR
	<i>Sporobolus teretifolius</i>	wireleaf dropseed	Poaceae	UR
97	<i>Stachys lythroides</i>	Tallahassee hedge-nettle	Lamiaceae	UR
	<i>Stahlia monosperma</i>	black cobana	Fabaceae	SR-T
	<i>Stenandrium fascicularis</i>	Texas stenandrium	Acanthaceae	UR
	<i>Stillingia sylvatica</i>	slender queen's delight stillingia	Euphorbiaceae	UR

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	<i>Streptanthus bracteatus</i>	contact mine twistflower	Brassicaceae	UR
	<i>Streptanthus carinatus</i>	lyre-leaved twistflower	Brassicaceae	UR
	<i>Streptanthus cutleri</i>	Cutler's twistflower	Brassicaceae	UR
	<i>Streptanthus sparsiflorus</i>	sparsely-flowered twistflower	Brassicaceae	PE
	<i>Streptanthus squamiformis</i>	prairie twistflower	Brassicaceae	PE
	<i>Styrax platanifolia stellata</i>	sycamore-leaved snowbell	Styraceae	PE
	<i>Styrax portoricensis</i>	Puerto Rico snowbell	Styracaceae	SR-T
	<i>Styrax texana</i>	Texas snowbell	Styraceae	PE
	<i>Styrax youngae</i>	Davis Mountain snowbell	Styraceae	UR
	<i>Suaeda duripes</i>	hard-toe seepweed	Chenopodiaceae	PE
	<i>Sullivantia ohionis</i>	Ohio sullivantia	Saxifragaceae	UR
	<i>Symphoricarpos guadalupensis</i>	McKittrick snowberry	Caprifoliaceae	UR
98	<i>Synandra hispidula</i>	gyandotte beauty synandra	Lamiaceae	UR
188	<i>Talinum appalachianum</i>	Appalachian fame-flower	Portulacaceae	PE
	<i>Talinum calcaricum</i>	lime fame-flower	Portulacaceae	SR-T
	<i>Talinum mengesii</i>	Menge's fame-flower	Portulacaceae	UR
202	<i>Taxus floridana</i>	Florida yew	Taxaceae	PE
	<i>Tectaria amesiana</i>	Ame's halberd-fern	Polypodiaceae	UR

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
77	Tephrosia mohrii	pineland hoary-pea	Fabaceae	UR
	Ternstroemia luquillensis	Luquillo Mountain ternstroemia	Theaceae	SR-T
	Ternstroemia subsessilis	Puerto Rico ternstroemia	Theaceae	SR-T
192	Thalictrum cooleyi	Cooley's meadow-rue	Ranunculaceae	PE
	Thalictrum debile	southern meadow-rue	Ranunculaceae	UR
	Thelocactus bicolor flavidispinus	yellow-spine straw thelocactus	Cactaceae	UR
	Thelypodium tenue	Fresno Creek thelypod	Brassicaceae	PE
	Thelypodium texanum	Texas thelypod	Brassicaceae	PE
	Tillandsia lineatispica	rock tillandsia	Bromeliaceae	SR-E
	Tithymalus austrinus	Florida jewbush	Euphorbiaceae	SR-T
203	Torreyia taxifolia	Florida torreyia	Taxaceae	PE
	Tradescantia edwardsiana	plateau spiderwort	Commelinaceae	UR
	Tradescantia wrightii	Wright's spiderwort	Commelinaceae	UR
	Tragia nigricans	dark noseburn	Euphorbiaceae	UR
	Tragia saxicola	Florida Key noseburn	Euphorbiaceae	UR
	Trichilia triacantha	three-spine bitterwood	Meliaceae	SR-E
177	Trillium persiciens	persistent trillium	Liliaceae	E
140 C	Trillium pusillum ozarkanum	Ozark least trillium	Liliaceae	UR

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
140 A	Trillium pusillum pusillum	common least trillium	Liliaceae	UR
140 B	Trillium pusillum virginianum	Virginia least trillium	Liliaceae	PE
141	Trillium texanum	Texas trillium	Liliaceae	UR
	Triphora craigheadii	Craighead's pogonia	Orchidaceae	PE
	Triphora latifolia	broad-leaved pogonia	Orchidaceae	PE
	Tripsacum floridanum	Florida gramagrass	Poaceae	PE
	Valeriana texana	Guadalupe valerian	Valerianaceae	SR-T
	Valerianella florifera	long-blooming corn-salad	Valerianaceae	SR-T
	Valerianella texana	Edward's plateau corn-salad	Valerianaceae	PE
178	Veratrum woodii	Woods' false helleborne	Liliaceae	SR-T
	Verbena maritima	coastal vervain	Verbenaceae	UR
204	Verbena tampensis	Tampa vervain	Verbenaceae	PE
72	Verbesina chapmanii	Chapman's crownbeard	Asteraceae	UR
73	Verbesina heterophylla	variable-leaf crownbeard	Asteraceae	UR
	Vernonia borinquensis	Puerto Rico ironweed	Asteraceae	SR-T
8	Vernonia pulchella	Georgia ironweed	Asteraceae	UR
	Viburnum bracteatum	southeastern viburnum	Caprifoliaceae	PE
57	Vicia ocalensis	Ocala vetch	Fabaceae	PE

September 1979

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Vicia reverchonii	hairy-podded vetch	Fabaceae	PE
	Viguiera ludens	field golden-eye	Asteraceae	PE
9	Viguiera porteri	Porter's golden-eye	Asteraceae	UR
	Viola egglestonii	Eggleston's violet	Violaceae	UR
	Waldsteinia lobata	piedmont strawberry	Rosaceae	UR
47	Warea amplexifolia	clasping warea	Brassicaceae	UR
	Warea carteri	Carter's warea	Brassicaceae	UR
48	Warea sessilifolia	sessile-leaved warea	Brassicaceae	PE
	Willkommia texana	Texas willkommia	Poaceae	UR
153	Xyris drummondii	Drummond's yellow-eyed grass	Xyridaceae	UR
154	Xyris isoetifolia	quillwort yellow-eyed grass	Xyridaceae	UR
155	Xyris longisepala	Kral's yellow-eyed grass	Xyridaceae	UR
156	Xyris scabrifolia	Harper's yellow-eyed grass	Xyridaceae	UR
52	Zamia integrifolia	Florida coontie	Cycadaceae	PE
	Zanthoxylum parvum	tickle-tongue prickly-ash	Rutaceae	PE
	Zanthoxylum thomasianum	St. Thomas prickly-ash	Rutaceae	SR-E
142 A	Zephyranthes simpsonii	rain zephyrlily	Liliaceae	UR
142 B	Zephyranthes treatiae	easter zephyrlily	Liliaceae	UR

<u>Number</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Status</u>
	Zizania texana	Texas wildrice	Poaceae	E
	Zizia latifolia	Bristol golden-alexanders	Apiaceae	UR

September 1979





Order Form for Species Description -  
Management Guides, General Report SA-GR 7

Directions: Circle the numbers corresponding to the desired species description -  
management guide(s).  
Enclose a self-adhesive return address label with each order.  
Send the completed form to:

USDA Forest Service  
Publications Distribution Center, Rm. 816  
1720 Peachtree Road N. W.  
Atlanta, Georgia 30309

- #1 Lesquerella densipila Rollins; Duck River bladderpod
- #11 Leavenworthia alabamica Rollins var. brachystyla Rollins; short-styled glade-cress
- #12 Leavenworthia crassa Rollins var. crassa; fleshy-fruited glade-cress
- #13 Leavenworthia crassa Rollins var. elongata Rollins; Falkville glade-cress
- #15 Leavenworthia exigua Rollins var. laciniata Rollins; Sheperdsville glade-cress
- #16 Leavenworthia exigua Rollins var. lutea Rollins; pasture glade-cress
- #28 Fimbristylis perpusilla Harper; Vahl's fimbry
- #29 Elliottia racemosa Ell.; common southern plume
- #31 Eriocaulon kornickianum Van Heurck & Muell. - Arg.; small-headed pipewort
- #33 Apios priceana B. L. Robins.; Price's groundnut
- #35 Petalostemon foliosum A. Gray; leafy prairie-clover
- #39 Silphium integrifolium Mchx. var. gattingeri Perry; Gattinger's entire-leaved  
rosinweed
- #40 Solidago shortii T. & G.; Short's goldenrod
- #41 Arabis perstellata (complex) Braun; prairie rock-cress
- #44 Lesquerella lyrata Rollins; lyrate bladderpod
- #45 Lesquerella perforata Rollins; Spring Creek bladderpod
- #46 Lesquerella stonensis Rollins; Stone's River bladderpod
- #49 Arenaria alabamensis (McCormick, Bozeman & Spongberg) Wyatt; Alabama sandwort
- #50 Sedum nevii A. Gray; Nevius' stonecrop
- #52 Zamia integrifolia Ait.; Florida coontie
- #53 Croton alabamensis E. A. Smith; Alabama croton
- #55 Baptisia arachnifera Duncan; hairy wild-indigo
- #57 Vicia ocalensis Godfrey & Kral; Ocala vetch
- #58 Castanea ozarkensis W. W. Ashe; Ozark chinquapin
- #59 Gentiana pennelliana Fern.; wiregrass gentian
- #60 Conradina brevifolia Shinnery; short-leaved rosemary
- #61 Conradina verticillata Jennison; whorled-leaved rosemary
- #62 Dicerandra frutescens Shinnery; shrubby dicerandra
- #63 Dicerandra immaculata Lakela; spotless-petaled dicerandra

- #64 Hedeoma graveolens Chapm.; mock pennyroyal
- #65 Macbridea alba Chapm.; white birds-in-a-nest
- #66 Linum westii C. M. Rogers; West's flax
- #67 Iliamna remota Greene; Kankakee globe-mallow
- #71 Silphium brachiatum Gattinger; cumberland rosinweed
- #74 Paronychia chartacea Fernald; paperlike nail-wort
- #83 Hypericum cumulicola (Small) P. Adams; highlands scrub hypericum
- #102 Balduina atropurpurea Harper; purple balduina
- #106 Justicia cooleyi Monachino and Leonard; Cooley's water-willow
- #107 Justicia crassifolia (Chapman) Small; thick-leaved water-willow
- #108 Asimina tetramera Small; opossum pawpaw
- #112 Oxypolis greenmanii Mathais & Constance; giant water cowbane
- #116 Hexastylis speciosa Harper; Harper's heartleaf
- #117 Aster pinifolius E. J. Alexander; pale-violet aster
- #119 Echinacea tennesseensis (Beadle) Small; Tennessee purple coneflower
- #121 Jamesianthus alabamensis S. F. Blake & E. E. Sherff; Alabama jamesianthus
- #122 Liatris ohlingerae (Blake) Robinson; Florida gay-feather
- #123 Liatris provincialis Godfrey; Godfrey's gay-feather
- #124 Marshallia mohrii Beadle and Boynton; Mohr's barbara's-buttons
- #125 Solidago albobilosa E. L. Braun; white-haired goldenrod
- #126 Silene polypetala (Walt.) Fern. & Schub.; fringed campion
- #128 Rhododendron chapmanii A. Gray; Chapman's rhododendron
- #132 Pinguicula ionantha Godfrey; violet-flowered butterwort
- #134 Haroerocallis flava McDaniel; yellow-petaled Harper's beauty
- #135 Hymenocallis coronaria (LeConte) Kunth; stream-bank spiderlily
- #137 Lilium iridollae M. G. Henry; panhandle lily
- #138 Nolina atopocarpa Bartlett; Florida beargrass
- #139 Nolina brittoniana Nash; Britton's beargrass
- #140 Trillium pusillum Michx. (complex); Wake robin
- #143 Cuphea aspera Chapm.; tropical waxweed
- #145 Rhexia parviflora Chapm.; small-flowered meadowbeauty
- #146 Calamovilfa arcuata K. E. Rogers; cumberland reedgrass
- #147 Phlox pulchra Wherry; Wherry's phlox
- #148 Polygonella ciliata Meisn. in DC. var. basiramea (Small) Horton; hairy jointweed
- #150 Polygonella myriophylla (Small) Horton; woody wireweed

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ACANTHACEAE, acanthus family

- #106 Justica cooleyi Monachino and Leonard; Cooley's water-willow
- #107 Justica crassifolia (Chapman) Small; thick-leaved water-willow

AMARYLLIDACEAE, amaryllis family

- #135 Hymenocallis coronaria (LeConte) Kunth; stream-bank spider lily

ANNONACEAE, pawpaw family

- #108 Asimonia tetramera Small; opossum pawpaw

APIACEAE, parsley family

- #112 Oxypolis greenmanii Mathais & Constance; giant water cowbane

ARISTOLOCHIACEAE, ginger family

- #116 Hexastylis speciosa Harper; Harper's heartleaf

ASTERACEAE, aster family

- #117 Aster pinifolius E. J. Alexander; pale-violet aster
- #102 Balduina atropurpurea Harper; purple balduina
- #119 Echinacea tennesseensis (Beadle) Small; Tennessee purple coneflower
- #121 Jamesianthus alabamensis S. F. Blake & E. E. Sherff; Alabama jamesianthus
- #122 Liatris ohlingerae (Blake) Robinson; Florida gay-feather
- #123 Liatris provincialis Godfrey; Godfrey's gay-feather
- #124 Marshallia mohrii Beadle and Boynton; Mohr's barbara's-buttons
- #071 Silphium brachiatum Gattinger; cumberland rosinweed
- #039 Silphium integrifolium Mchx. var. gattingeri Perry; Gattinger's entire-leaved rosinweed
- #125 Solidago albopilosa E. L. Braun; white-haired goldenrod
- #040 Solidago shortii T. & G.; Short's goldenrod

BRASSICACEAE, mustard family

- #41a Arabis perstellata Braun var. ampla Braun; large prairie rock-cress
- #41b Arabis perstellata Braun var. perstellata Braun; small prairie rock-cress
- #011 Leavenworthia alabamica Rollins var. brachystyla Rollins; short-styled glade-cress
- #012 Leavenworthia crassa Rollins var. crassa Rollins; fleshy-fruited glade-cress
- #013 Leavenworthia crassa Rollins var. elongata Rollins; Falkville glade-cress
- #015 Leavenworthia exigua Rollins var. taciniata Rollins; Sheperdsville glade-cress
- #016 Leavenworthia exigua Rollins var. tutea Rollins; pasture glade-cress
- #001 Lesquerella densipila Rollins; Duck River bladderpod
- #044 Lesquerella lyrata Rollins; lyrate bladderpod
- #045 Lesquerella perforata Rollins; Spring Creek bladderpod
- #046 Lesquerella stonensis Rollins; Stone's River bladderpod
- #048 Warea sessilifolia Nash; sessile-leaved warea

CARYOPHYLLACEAE, pink family

- #049 Arenaria alabamensis (McCormick, Bozeman & Spongberg) Wyatt; Alabama sandwort
- #074 Paronychia chartacea Fernald; paperlike nail-wort
- #126 Silene polypetala (Walt.) Fern. & Schub.; fringed campion

CRASSULACEAE, stonecrop family

#50 Sedum nevii A. Gray; Nevius' stonecrop

CYCADACEAE, cycad family

#52 Zamia integrifolia Ait.; Florida coontie

CYPERACEAE, sedge family

#28 Fimbristylis perpusilla Harper; Vahl's fimbry

ERICACEAE, heath family

#029 Elliptia racemosa Ell.; common southern plume

#128 Rhododendron chapmanii A. Gray; Chapman's rhododendron

ERIOCAULACEAE, pipewort family

#31 Eriocaulon kornickianum Van Heurck & Muell. - Ar.; small-headed pipewort

EUPHORBIACEAE, spurge family

#53 Croton alabamensis E. A. Smith; Alabama croton

FABACEAE, legume family

#33 Apios priceana B. L. Robins.; Price's groundnut

#55 Baptisia arachnifera Duncan; hairy wild-indigo

#35 Petalostemum foliosum A. Gray; leafy prairie-clover

#57 Vicia ocalensis Godfrey & Kral; Ocala vetch

FAGACEAE, beech family

#58 Castanea ozarkensis W. W. Ashe; Ozark chinquapin

GENTIANACEAE, gentian family

#59 Gentiana pennelliana Fern.; wiregrass gentian

HYPERICACEAE

#83 Hypericum cumulicola (Small) P. Adams; highlands scrub hypericum

LAMIACEAE, mint family

#60 Conradina brevifolia Shinnery; short-leaved rosemary

#61 Conradina verticillata Jennison; whorled-leaved rosemary

#62 Dicerandra frutescens Shinnery; shrubby dicerandra

#63 Dicerandra immaculata Lakela; spotless-petaled dicerandra

#64 Hedeoma graveolens Chapm.; mock pennyroyal

#65 Macbridea alba Chapm.; white birds-in-a-nest

LENTIBULARIACEAE, bladderwort family

#132 Pinguicula ionantha Godfrey; violet-flowered butterwort

LILIACEAE, lily family

#134 Harperocallis flava McDaniel; yellow-petaled Harper's beauty

#137 Lilium iridollae M. G. Henry; panhandle lily

#138 Nolina atopocarpa Bartlett; Florida beargrass

#139 Nolina brittoniana Nash; Britton's beargrass

#140a Trillium pusillum Michx. var. ozarkanum (Palmer & Steyermark) Steyermark; Ozark least trillium

#140b Trillium pusillum Michx. var. pusillum Michx.; common least trillium

#140c Trillium pusillum Michx. var. virginianum Fern.; Virginia least trillium

LINACEAE, flax family

#66 Linum westii C. M. Rogers; West's flax

LYTHRACEAE, lythrum family

#143 Cuphea aspera Chapm.; tropical waxweed

MALVACEAE, mallow family

#67 Iliamna remota Greene; Kankakee globe-mallow

MELASTOMATACEAE, meadowbeauty family

#145 Rhexia parviflora Chapm.; small-flowered meadowbeauty

POACEAE, grass family

#146 Calamovilfa arcuata K. E. Rogers; cumberland reedgrass

POLEMONIACEAE, phlox family

#147 Phlox pulchra Wherry; Wherry's phlox

POLYGONACEAE, buckwheat family

#148 Polygonella ciliata Meisn. in DC. var. basiramea (Small) Horton; hairy jointweed

#150 Polygonella myriophylla (Small) Horton; woody wireweed



BRASSICACEAE

Lesquerella densipila Rollins; Duck River bladderpod

Technical Description

Taprooted annual from winter rosettes.

Stems.--Usually numerous, slender but stiffish, mostly 1-3 dm long, arching outward and upward in all directions from the root, terete, leafy from base to inflorescence, pilose with long weak hairs, pale green.

Leaves.--Rosette leaves 4-10 cm long, oblanceolate, lyrate or runcinate-pinnatifid (like dandelion). Stem leaves with lowest longest, elliptic, oblong, ovate, or obovate, mostly 3 cm long or less, ascending, acute to obtuse, the margin entire to distantly and coarsely low-toothed, the base auriculate-clasping, the surfaces pale green, pilose-hirsute, particularly toward the margins and along the midrib beneath.

Inflorescence.--An elongating raceme, the slender flower stalks ascending, longer than the open flower, compact at the flowering level, becoming more distant as the fruit ripens and the raceme axis elongates. Pedicels pilose, becoming 1-2 cm long in fruit.

Flowers.--Sepals, ovate or oblong, 3-4 mm long, somewhat calyculate (boat-shaped) acute or narrowly rounded, entire with narrow pale margins, erect or slightly spreading in bloom, the backs yellowish-green, pilosulous (with small, weak pale hairs). Petals 4, broadly obovate, 6-8 mm long, bright yellow, the bases cuneate, clawless, Stamens 6, 2 shorter; anthers erect, ca. 1 mm long, yellowish, oblong; filaments abruptly flattened and dilated basally.

Fruit.--Silicles globose or broader than long, 3-5 mm long, the surfaces covered with very fine, short hairs; style with some hairs; septum complete, not perforate. Seeds 2-4 locule, flattened and margined, 2.0-2.5 mm long.

Distribution and Flowering Season

Open alluvial sites, roadbanks, fields, or thin soil over limestone glades, middle Tennessee southward into northern Alabama. Flowering from February to late April.

Special Identifying Features

Of the auriculate-leaved species of Lesquerella known from the Southeast, this species is distinguished by a combination of yellow petals, and a globose fruit, the surface of which is copiously, minutely hairy.

## Habitats and Management Implication

The habitats of this species vary rather widely from open limestone glades where it may be found with some species of Leavenworthia to very disturbed lowland situations where the substrate is a sticky, clayey circumneutral alluvium. These are plants of full sunlight and are today found in lowlands where the timber has been cut to provide fields or pasture. They are of optimum abundance in recently abandoned croplands in river or stream bottoms and should be considered part of early stages in secondary succession toward bottomland hardwoods or, in the case of glade populations to Juniperus, ultimately to mixed upland hardwoods. Thus, cutting of bottomland hardwoods or upland hardwoods in areas contiguous to populations of this and other Lesquerella species would probably increase the population of L. densipilla. They are definitely decreased by intensive row crop agriculture if sustained, or by the improvement of lowland pasture with grass species which would close the community.

## Suggested Reading

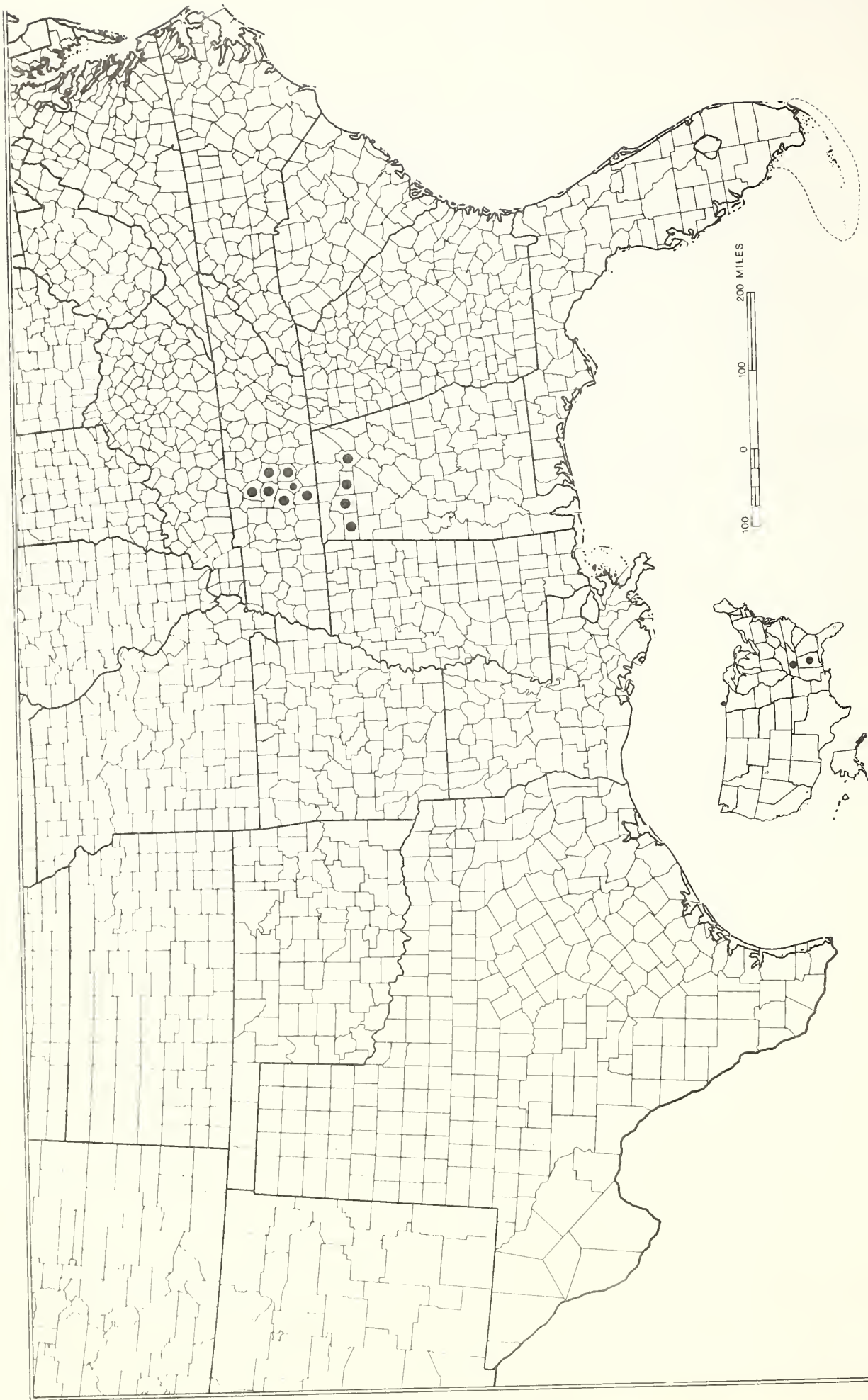
- Rollins, R. C. 1955. The auriculate-leaved species of Lesquerella (Cruciferae.) *Rhodora* 57: 241-264.
- \_\_\_\_\_ and E. A. Shaw 1973. The genus Lesquerella (Cruciferae) in North America. pp. 1-288. Cambridge, Mass.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 555-556.

SPECIES: #1 Lesquerella densipila Rollins; Duck River bladderpod

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy							X	
Damage								X
No lasting effect	NA	NA	NA	NA				
Beneficial if done properly					X	X		

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—



MAP 1. *LESQUERELLA DENSIPILA*

## BRASSICACEAE

### Leavenworthia Torrey; glade-cress

The description below is generalized for Leavenworthia and will apply to all endangered or threatened species.

Smooth (usually low) annual herbs usually from winter rosettes.

Leaves.--First leaves of a rosette usually simple with long, slender petioles and broad, but small blades, those developing later becoming pinnatifid with the terminal lobe largest (often broader than long) and with the lateral pairs of segments mostly opposite, few to many, and of various outlines from narrowly linear to broadly triangular or oblong, ovate, obovate or round, and with leaflet margins from entire to toothed or lobed.

Inflorescence.--First flowers on erect simple stalks, usually several from a rosette. Later, flowers usually in loose racemes from true stems from axils of rosette leaves.

Flowers.--Nearly or entirely symmetrical, usually open only on sunny days, the ones in racemes with pedicels longer than the flowers by anthesis (flowering time).

Sepals 4, erect or spreading or with spreading tips, mostly linear or narrowly triangular, green. Petals 4, mostly spreading apically, longer than sepals, obovate or lingulate (tongue-shaped), mostly white with yellow bases (eye), or yellow with orange bases, or lavender with orange bases. Stamens 6, 4 longer.

Fruit.--A silique either flattened parallel to the septum (partition) or nearly to quite round in cross section. Seeds in one row, flattened, winged or nearly wingless, from nearly round to longer than broad.

### Habitats and Management Implication

All Leavenworthia on the threatened and endangered list have the following characteristics in common:

1. They are plants of full sun.
2. They occur on flat-bedded outcrops of limestone or on the shallow soils derived therefrom, commonly in what are called limestone glades or cedar glades. They are part of an early plant successional stage that leads to occupancy by Juniperus virginiana and finally to mixed hardwoods, these last mostly oaks, hickories, elms, and ash. The limestone habitats are in a climate regimen that makes them very wet during late winter and early spring, droughty during summer. All species treated here are found within an area extending from middle and western Kentucky southward through Tennessee into northern Alabama and northwestern Georgia with a concentration of species in the limestone barrens of middle Tennessee.
3. They all are very restricted in total range but may be aspect dominant, locally.
4. All bloom in early spring, are in fruit by late spring and have almost completely dried and gone by early summer.

The primary threat faced by most Leavenworthia species relates to the conversion of the limestone barrens to housing or industrial development, or to improved

pasture. In the case of development for housing or industrial use, the habitat is utterly destroyed. In the case of development for improved pasture, these winter annuals do not compete well with bluegrass, fescue, bermuda grass or any other of the forage or hay grasses which, in good pasture, assume dominance. Such is not the case in unimproved or overused pasture, where exposures of substrate are usually covered with Leavenworthia and other glade annuals.

As stated above, Leavenworthia is part of an early successional stage which usually gives rise to Juniperus virginiana subclimax. It will persist for a time in clearings where stocking is incomplete, but is lost in any area where shade is complete. Clearcutting of Juniperus or other forest cover so as to re-expose mineral earth or outcrops promotes reoccupancy by Leavenworthia. It is frequently abundant in areas such as powerline clearings where the forest cover has been completely removed, just as it sometimes is found in abundance in abandoned croplands within the range of the species.

#### Suggested Reading

Rollins, R. C. 1963. The evolution and systematics of Leavenworthia (Cruciferae). *Contribs. Gray Herb.* CXCI: 3-98.

Small, J. K. 1933. *Manual of the Southeastern Flora*, pp. 569-570.

BRASSICACEAE

Leavenworthia alabamica Rollins var. brachystyla Rollins;  
Short-styled glade-cress

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Technical description

Technical Description for type variety (L. alabamica Rollins alabamica)

Leaves: Larger rosette leaves rarely longer than 1 dm. long, oblanceolate, the terminal segment sometimes round but more often reniform (broader than long), usually coarsely dentate or crenate; lateral segments usually several pairs, mostly asymmetrical, from broadly to narrowly triangular (often with tips pointing upward or downward) or obovate, entire or variously toothed or lobed, and with leaflet pairs progressively reduced in size and more distant on the rachis downward.

Flowers: Sepals mostly oblong, 5-7 mm. long, spreading at flowering time, pale green with tints of maroon. Petals obovate, 1.0-1.4 cm. long, spreading at anthesis, the blade white to pale lavender, deeply emarginate, the base (including the short claw) yellow or orange yellow.

Fruit: Silique narrowly oblong, not fleshy, acute above and below, strongly flattened, 1.5-2.5 cm. long, 3.0-4.5 mm. wide; style 2.5-5.5 mm. long. Seeds dark brown, orbicular, winged, 3-4 mm. in diameter.

Distribution and Flowering Season

Variety brachystyla is found only in Morgan County glades (Alabama) whereas the var. alabamica has its eastward extension in middle Lawrence County, the county just to the west. While the plants are locally abundant, they occur only in 5 small areas so far as is known. According to Rollins (1963) this variety has arisen through first spatial isolation, then a trend toward self-compatibility.

Special Identifying Features

Similar to the type variety but styles shorter (1.5-3.0 mm. versus 2.5-5.5 mm.), and siliques rounded above and below (rather than acute above and below).



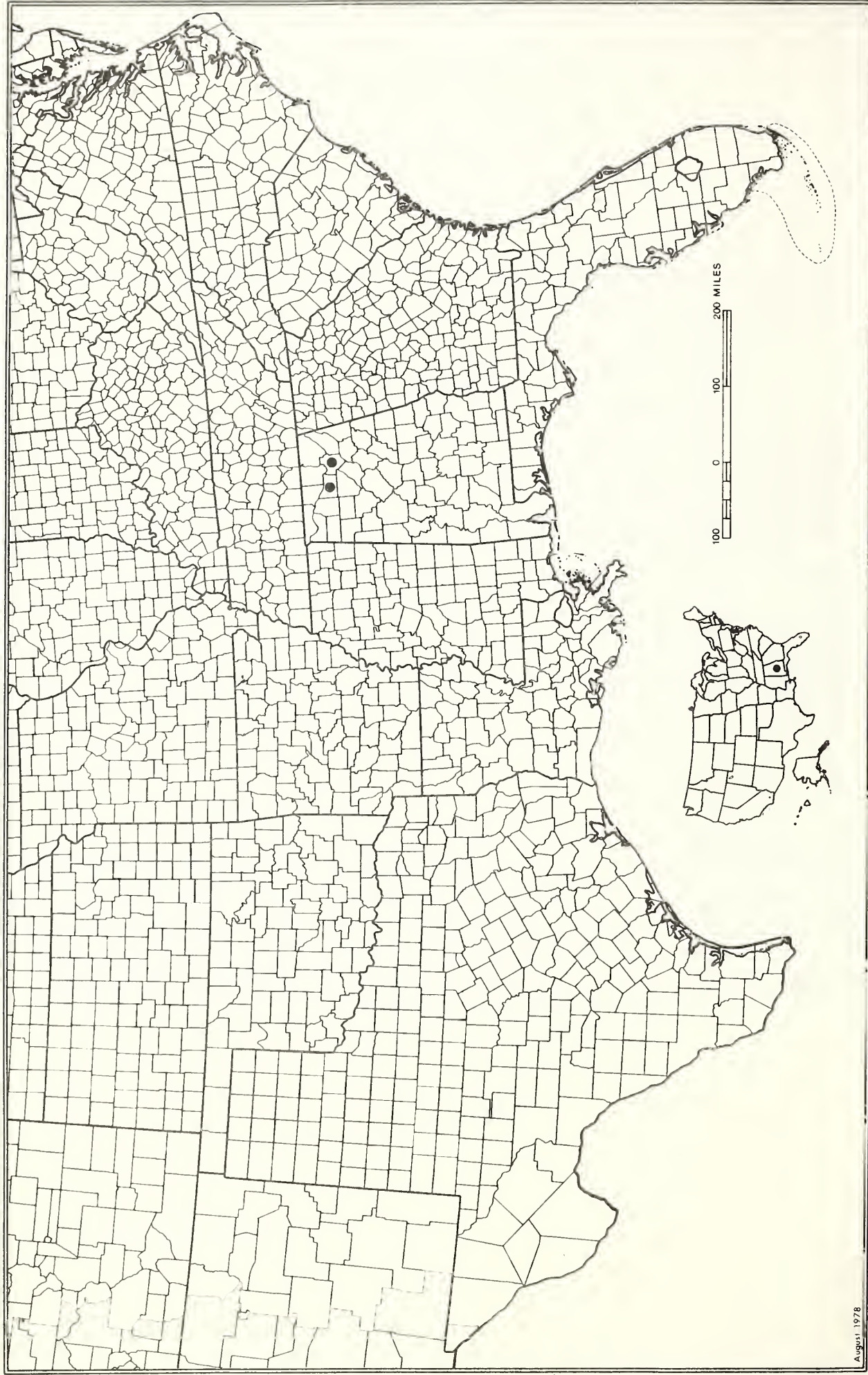
#11 Leavenworthia alabamica Rollins var. brachystyla Rollins;  
SPECIES: Short-styled glade-cress

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect	NA	NA	NA	NA				X
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 11. *LEAVENWORTHIA ALABAMICA BRACHYSTYLA*

BRASSICACEAE

Leavenworthia crassa Rollins var. crassa;  
fleshy-fruited glade-cress

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Technical Description

Leaves.--Earliest leaves entire or shallowly toothed; largest leaves of fully grown plants lyrate pinnatifid, 3-8 cm long, with the terminal lobe 0.5-2.0 cm broad.

Flowers.--Sepals linear-oblong, 5.0-6.5 mm long, spreading. Petals obovate to spatulate, deeply emarginate, 9-14 mm long, yellow with orange claw or white with yellow claw, blades spreading.

Fruit.--Siliques fleshy, globose to oblong, 6-12 mm long, 3.5-6.0 mm wide, 2.5-5.0 mm thick; styles 2.5 - 6.0 mm long. Seeds 2-8 per fruit, dark brown, winged, nearly round.

Distribution and Flowering Season

Limestone glades in southeastern Lawrence and southwestern Morgan counties, Alabama. Locally abundant in a few localities within this small range.

Special Identifying Features

The species Leavenworthia crassa is distinguished from other Leavenworthias with emarginate petals by its non-torulose, fleshy siliques. This separates them from nearby populations of L. alabamica. It is similar in some respects of flower and fruit to L. stylosa, a species of middle Tennessee, but differs in its shorter (6-12 mm versus 12-25 mm long) siliques. It has the longest styles in relation to body length.



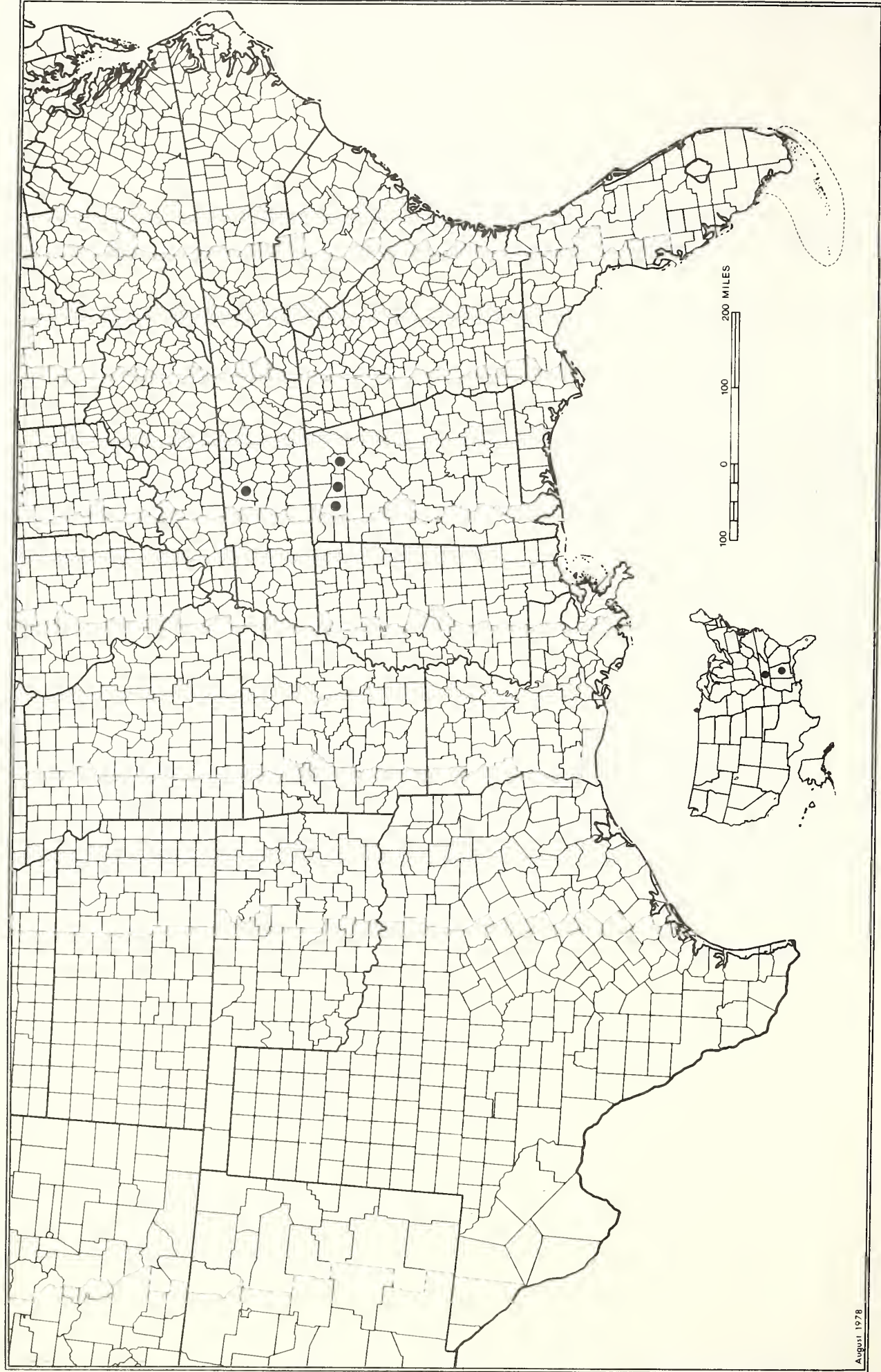
#12 Leavenworthia crassa Rollins var. crassa;  
SPECIES: fleshy-fruited glade-cress

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy							X	
Damage								
No lasting effect	NA	NA	NA	NA				X
Beneficial if done properly					X	X		

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980



MAP 12. LEAVENWORTHIA CRASSA CRASSA

BRASSICACEAE

Leavenworthia crassa Rollins var. elongata Rollins;  
Falkville glade-cress

Special Identifying Features

As in the type variety but siliques with a longer range (8-12 mm. long versus 6-10 mm. long) and with petals consistently yellow (versus white to yellow in type variety) and 9-11 mm. long rather than 10-13 mm. long.

Distribution and Flowering Season

Known only from Southeastern Morgan County, Alabama (4 localities, all small).

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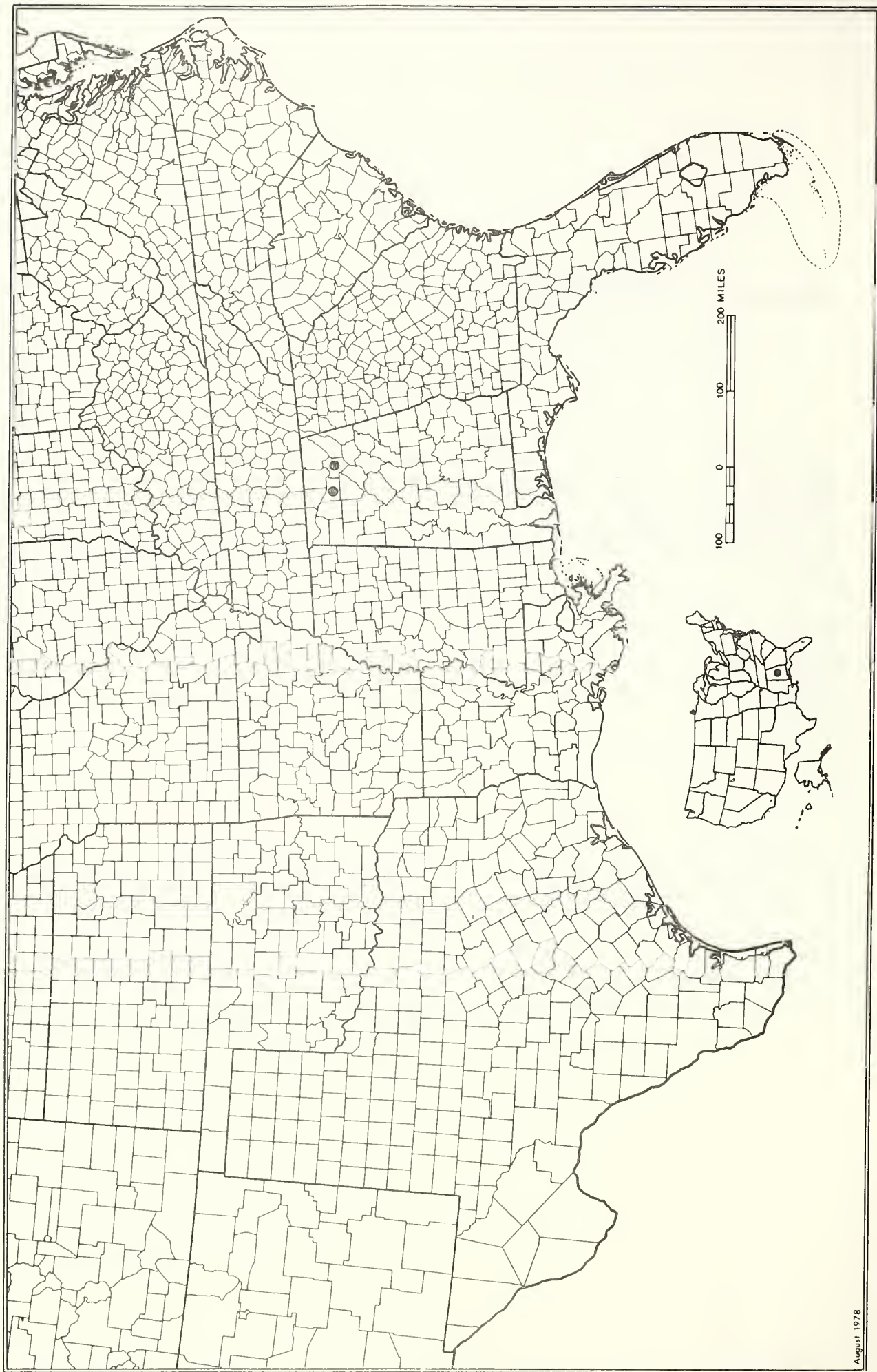
#13 Leavenworthia crassa Rollins var. elongata Rollins;  
SPECIES: Falkville glade-cress

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect	NA	NA	NA	NA				X
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 13. LEAVENWORTHIA CRASSA ELONGATA

BRASSICACEAE

Leavenworthia exigua Rollins var. laciniata Rollins;  
Sheperdville glade-cress

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Technical Description

Technical Description for type variety (L. exigua Rollins var. exigua)

Leaves: Early leaves with a remote, shallowly toothed terminal lobe, fully developed leaves lyrate-pinnatifid (see genus description), 1.5-6 cm. long, the lobes with varied margins.

Flowers: Sepals linear-oblong, 3.5-5.5 mm. long, greenish or with lavender tints, erect or spreading in full flower. Petals spatulate to tongue-shaped, shallowly emarginate, 6-9 mm. long, 3.0-4.5 mm. wide, blade white to light lavender, the "eye" spot yellowish or petals yellow in the variety lutea.

Fruit: Siliques very flattened, non-fleshy, oblong, 1-2 cm. long, 3.5-5.5 mm. wide, obtuse above and below, the style 1-3 mm. long. Seeds 4-10/silique, winged, nearly flat, unevenly round, 3-4 mm. broad.

Distribution and Flowering Season

This variety is confined to Bullitt County, Kentucky and is thus far known from but one locality (open field, Ridge Road, 27 Mar. 1954, H. A. Korfhage 2). It is not known whether this variety has persisted but every effort should be made to preserve it in this, the only known place for it. However the site is a field, not a glade and in such places these species persist more through disturbance than through a lack of it.

Special Identifying Features

As in the type variety but styles 2-3 mm. long and sepals green (versus styles 1-2 mm. long and sepals tinted with lavender).



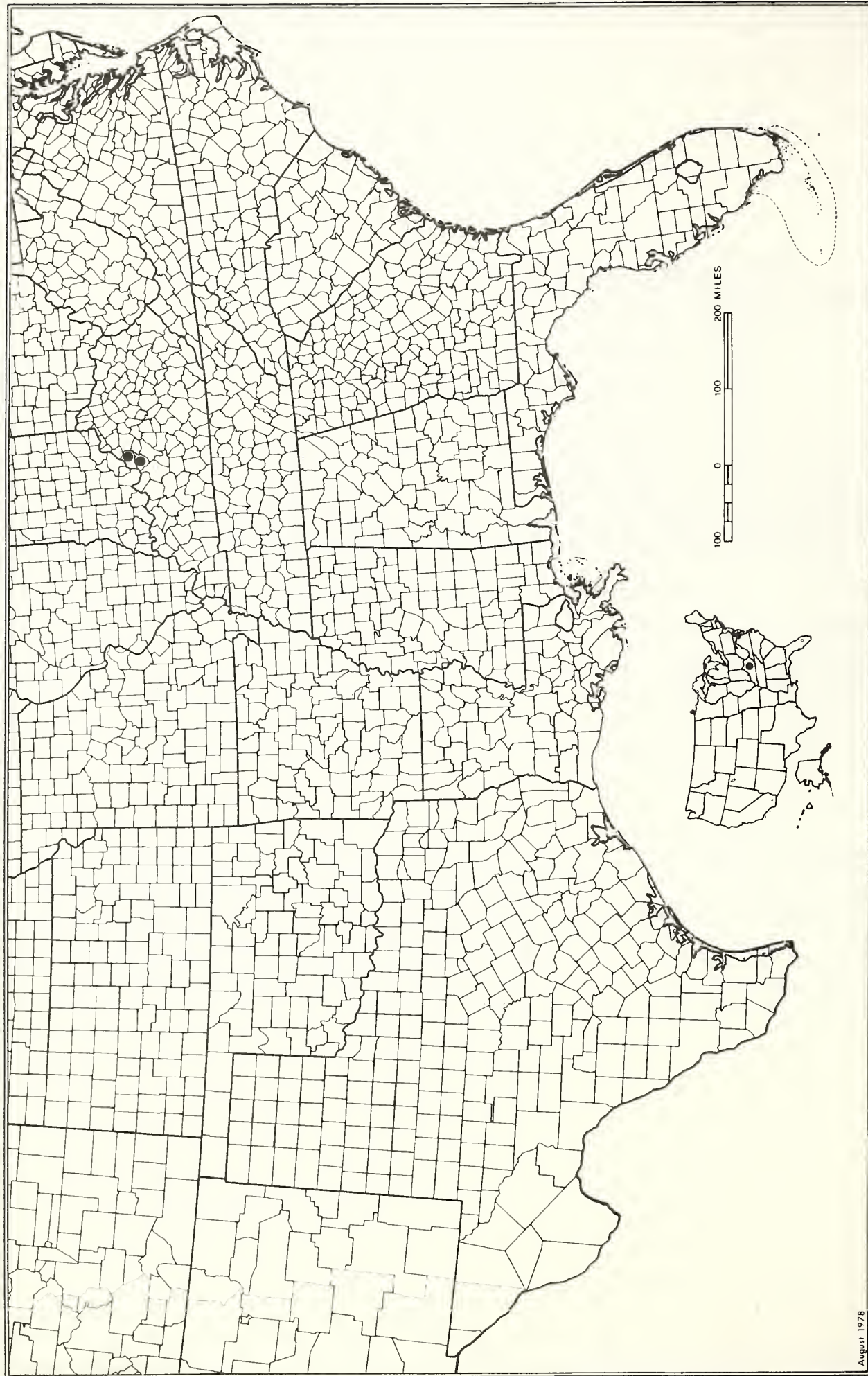
#15 Leavenworthia exigua Rollins var. laciniata Rollins;  
 SPECIES: Sheperdville glade-cress

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect	NA	NA	NA	NA				X
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 15. *LEAVENWORTHIA EXIGUA LACINIATA*

BRASSICACEAE

Leavenworthia exigua Rollins var. lutea Rollins;  
Pasture glade-cress

Technical description

Technical Description for type variety (L. exigua Rollins var. exigua)

Leaves: Early leaves with a remote, shallowly toothed terminal lobe, fully developed leaves lyrate-pinnatifid (see genus description), 1.5-6 cm. long, the lobes with varied margins.

Flowers: Sepals linear-oblong, 3.5-5.5 mm. long, greenish or with lavender tints, erect or spreading in full flower. Petals spatulate to tongue-shaped, shallowly emarginate, 6-9 mm. long, 3.0-4.5 mm. wide, blade white to light lavender, the "eye" spot yellowish or petals yellow in the variety lutea.

Fruit: Siliques very flattened, non-fleshy, oblong, 1-2 cm. long, 3.5-5.5 mm. wide, obtuse above and below, the style 1-3 mm. long. Seeds 4-10/silique, winged, nearly flat, unevenly round, 3-4 mm. broad.

Distribution and Flowering Season

The var. lutea is known only from St. Clair and Jefferson counties in Alabama, from a total of perhaps six localities.

It is found on heavy clay soils around very localized outcrops of massive dolomitic limestone and on the shallow soils of cracks in the outcrops themselves. Invariably the sites are in pasture and/or grazed, the plants persisting in spite of considerable trampling by cattle.

Special Identifying Features

As in the type variety but petals golden yellow.



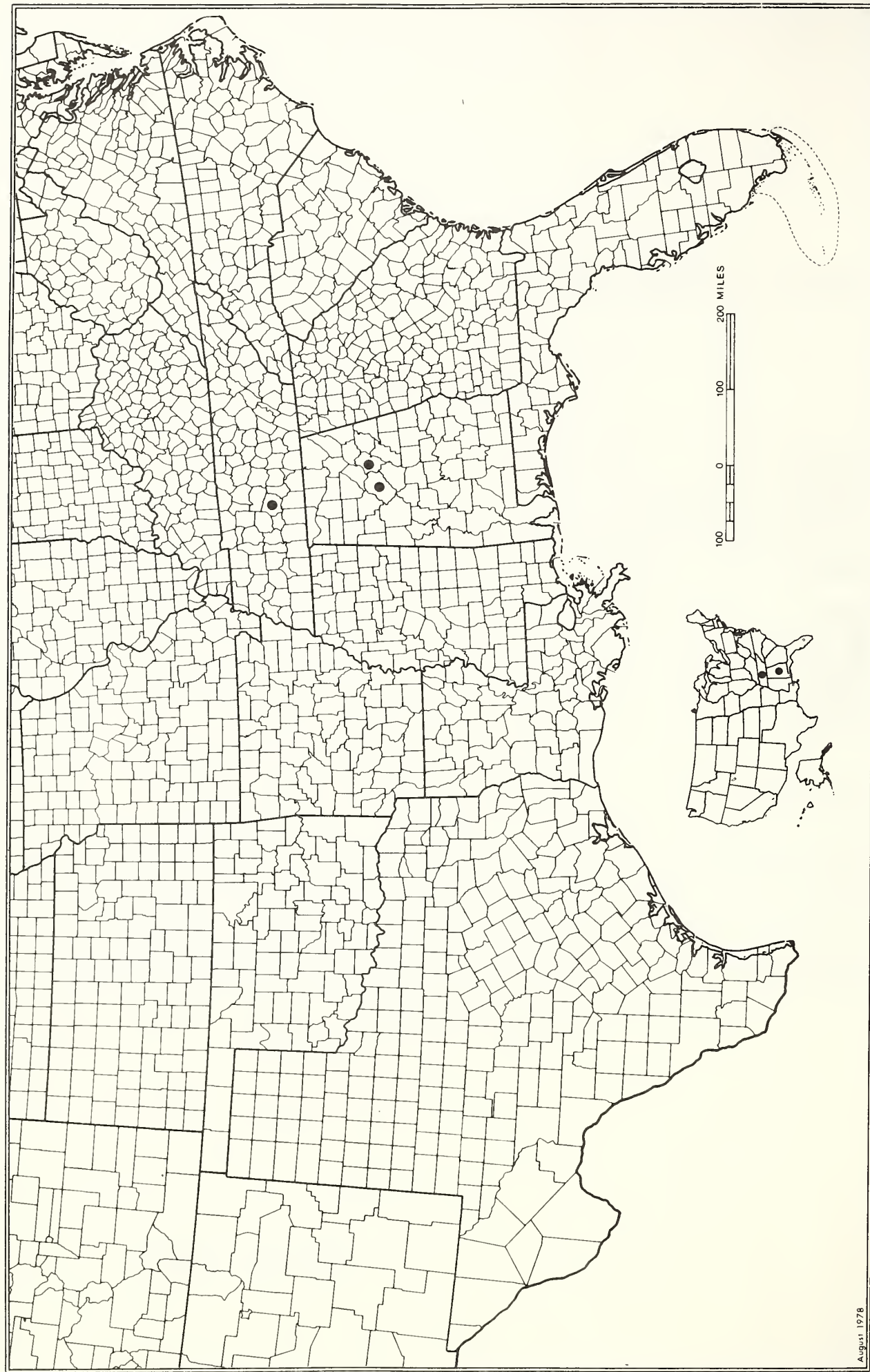
#16 Leavenworthia exigua Rollins var. lutea Rollins;  
SPECIES: Pasture glade-cross

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect	NA	NA	NA	NA				X
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 16. *LEAVENWORTHIA EXIGUA LUTEA*

CYPERACEAE

Fimbristylis perpusilla Harper; Vahl's fimbry

Technical Description

A low annual, rarely as tall as 8 cm.

Culms: The stems usually bunched, spreading or erect from shallow, fibrous roots.

Leaves: Mostly basal, the sheathes loose, the blades linear-filiform, often as long as the whole plant or longer, spreading, smoothish.

Inflorescence: Flowering spikes ovoid or oblong, 2-4 mm. long, borne in small umbel-like cymes at the tips of very slender stalks, the central spike usually sessile, with others on stalks of various lengths, all subtended by long, slender, leaf-like bracts. Fertile scales spirally arranged, numerous, linear-lanceolate, the slender tips somewhat spreading and giving a "bristly" look to the small spikes.

Flowers: Stamen 1. Style 2-branched above.

Fruit: Akene, cylindrical-curved, "banana"-shaped, 0.4-0.6 mm. long, finely longitudinally-and-cross-lined.

Distribution and Flowering

This species is known from pond banks in but two counties in the Coastal Plain of Georgia (Seminole, Sumter), thus may be the rarest species of sedge in the United States.

Habitats and Management Implications

F. perpusilla where found is very abundant on the silty banks of natural ponds in pine flatwoods clearings, usually where drying has produced extensive areas of mud. There a literal "fuzz" of these low plants develops. Evidently the seeds can lie dormant for extended periods. In the locality where the species was first found in great abundance it was never again located, though many have returned to the exact place over the years. In the Seminole county locality it was found in 1962 in abundance, a few plants in 1963, then none were reported until 1972 when it appeared again in great numbers. Mysteriously, though there are at least four similar ponds in the same vicinity and presumably with the same habitat, no specimens have ever been observed around these.

Obviously, this species is too poorly understood to understand how, precisely, it is to be maintained in its small niche. The most likely approach is to mark the locality then leave it alone. The area is in the karst belt, where most of

the ponds are small subsidences due to slump of underground caverns in limestone. Ecologically, the area is low savanna with a scattering of slash, longleaf and loblolly, underneath with a scattering of palmetto and gallberry but mostly with grasses and sedges. The present use of land in both areas is for pasture, an attempt being made to use the ponds as stock tanks and at the same time to convert the grass-sedge cover to palatable grasses such as bahia and bermuda. However, none of these pose a threat in that they do not occupy the mud of the pond bank. The major risk would arise from too much trampling of the pondbank by watering cattle or an actual draining of the area. F. perpusilla is a plant of full sunlight, so that establishment of a stand or plantation of pine would doubtless shade it out.

#### References

- Harper, R. M. 1904. Explorations of the Coastal Plain of Georgia during season of 1902. Bull, Torr. Bot. Club 31: 9-27.
- Kral, R. 1971. A treatment of Abildgaardia, Bulbostylis and Fimbristylis for North America. Sida 4 (2): 57-227.

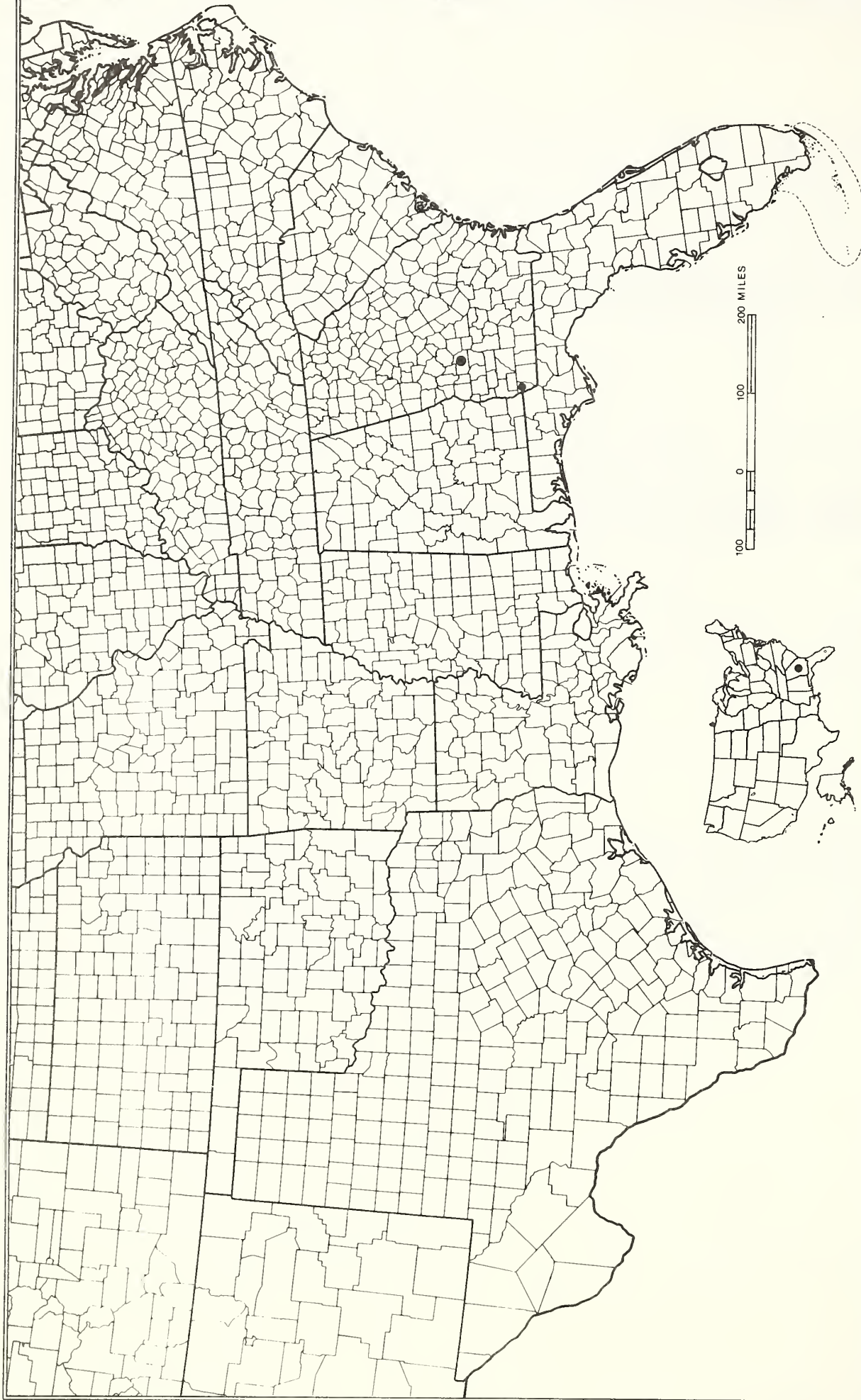
SPECIES: #28 Fimbristylis perpusilla Harper; Vahl's fimbry

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect								X
Beneficial if Done Properly	X				X	X		

Other Comments: Do not drain

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 28. FIMBRISTYLIS PERPUSILLA

ERICACEAE

Elliottia racemosa Ell.; Common southern plume

Technical Description

Tall shrub or low tree, forming small thickets from a spreading, shallow rootstock.

Stems.--The trunk is usually erect, rarely reaching 7 m, the diameter to 20 cm. The bark is pale gray, smoothish but vertically cracked. Branches are somewhat ascending, forming a narrowish crown, the 2-year-old twigs are slender, but stiffish, with grayish bark, this vertically cracking, the current season's shoots grayish or pale brown with reddish tones, the lenticels slightly raised, dark, the leaf scars circular or semicircular with one round bundle trace in the middle; lateral buds are small, short-conic, reddish, imbricate, smoothish.

Leaves.--Simple, deciduous, spreading-ascending, folded somewhat peach-like, drooping, spirally arranged, the larger blades 7-10 cm long on reddish petioles approximately 1 cm long, elliptic to oblanceolate, thinnish, the apex acute, sometimes mucronate, the margins entire, usually reddish, slightly rolled inward toward the midrib beneath, the base acute or short-attenuate, the upper surface dark green, smooth, the lower surface pale, finely reticulate, soft-hairy, with a strongly raised midrib.

Flowers.--Spreading in terminal racemes 8-20 cm long, on slender stalks 1.0-1.5 cm long, these subtended by a single linear-acuminate deciduous bract about 4-5 mm long and usually bearing a pair of smaller deciduous, ciliate, often subopposite bracts medially. Perianth regular, the corolla bell-shaped, the separate petals about 1 cm long, linear, white, at first erect, then recurved-tipped. Sepals 4, low-triangular, about 1 mm long, greenish-red, ciliate, spreading. Stamens 8, shorter than the petals, erect, the anthers 1.0-1.3 mm long, oblong, each with a short, narrow tip, opening longitudinally. Style projecting beyond the spreading corolla, narrow, elongate, tipped with a truncate, thickish stigma; ovary 4 (rarely 5)-lobed.

Fruit.--A round or depressed-roundish smooth, capsule slightly less than 1 cm broad when ripe and then splitting along the valves. Seeds agglutinated to the placenta, somewhat laterally compressed, obovoid, ca. 2 mm long. (According to some authors, these plants do not self, therefore pollen must be received from neighboring clones. Frequently the fruit does not produce much seed, or none at all are produced.)

Distribution and Flowering Season

Elliottia, with but one species, is presently known but from a few clones in the sandhills of Georgia's Coastal Plain, mostly in or near the drainage of the Altamaha River. It has been reported from South Carolina, but not recently. It flowers from June to August, with heaviest bloom during July.

## Habitats and Management Implication

E. racemosa is always found on well-drained, sandy, acidic soils, usually in sandhills and with a forest cover either of longleaf pine-deciduous scrub oak or pine-evergreen scrub (particularly oak.) In no case does it persist where the water table approaches the surface, thus, though it is found sometimes in bottoms near the Altamaha, it is there only on sandy rises. Usually what might appear to be a rather large population is actually one plant because new stems arise from a shallow, wide-spreading root system.

In that the type of forest assemblage which this species associates with is of low potential for lumber, the greatest hazard the species would be faced with would be stand improvement cutting, where few trees of merchantable size or quality would be cut together with the low quality species. Selective cutting, would pose no problems for Elliottia unless the logging operations mechanically damage the plants. Such an event is unfortunately quite possible for this is a shallow-rooted species. Being a thin-barked species it is also highly susceptible to fire damage, though it will readily resprout from the roots. A type of webworm does extensive damage to the foliage and inflorescence. Site preparation, which would involve mechanical alteration of the soil subsequent to clearcutting, would of course eliminate the species, which is a poor setter of seed and therefore unlikely to repopulate through seed from adjacent populations or survivors from amongst the clone affected.

This is such a rare species that all who work within its small existing area are urged to mark the clones and to make every effort toward their preservation.

## Suggested Reading

Faircloth, W. R. 1970. An occurrence of Elliottia in central south Georgia. *Castanea* 35:58-61.

Harper, R. 1903. Elliottia racemosa again. *Torreyia* 3:106.  
1905. Phytogeographical exploration in the Coastal Plain of Georgia in 1903. *Bull. Torr. Bot. Club* 32: 141-171.

Ravenel, H. W. 1976. Some rare southern plants. *Bull. Torr. Bot. Club* 6:81-82.

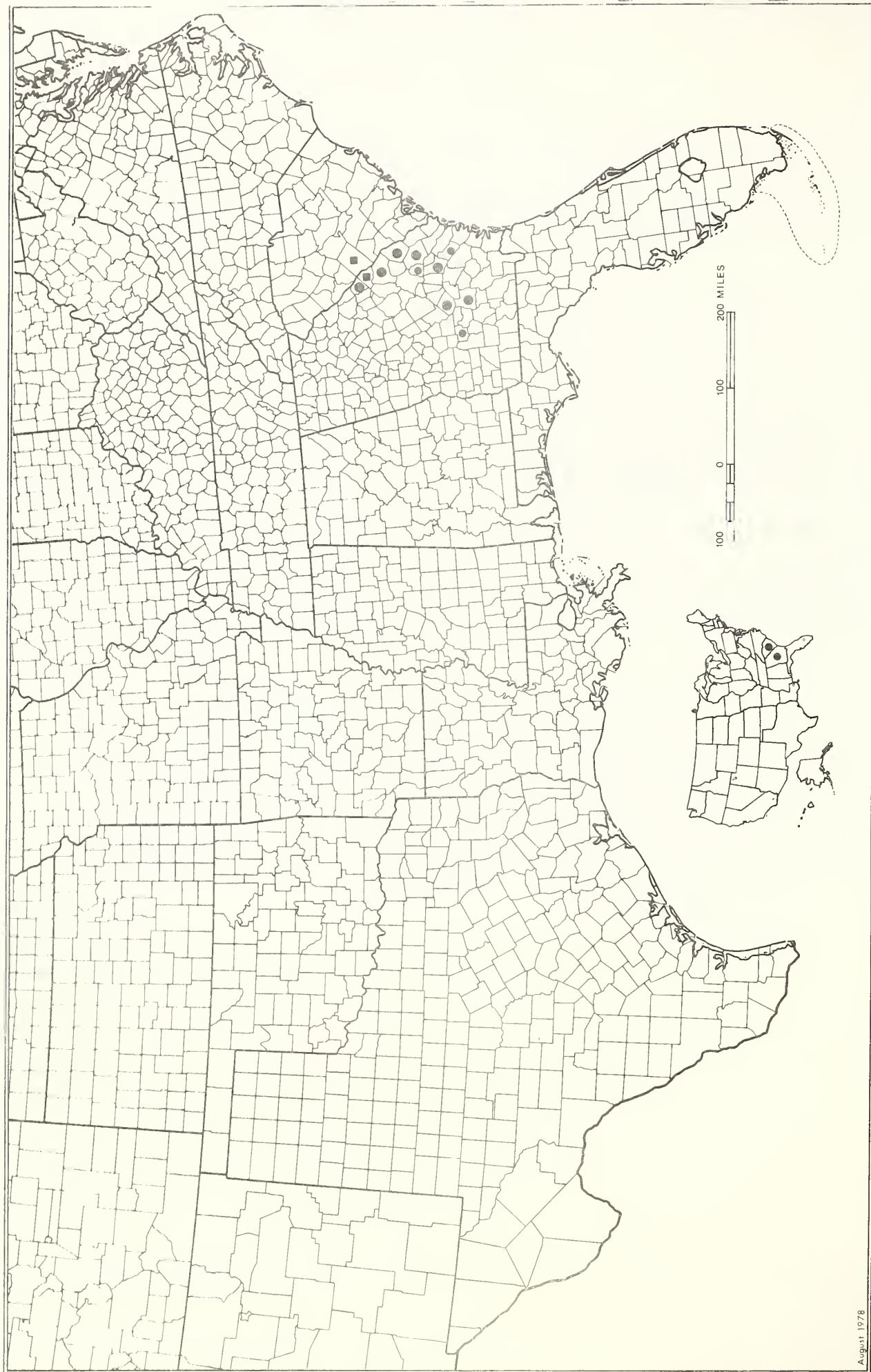
Small, J. K. 1933. Manual of the southeastern flora: 992-993.

SPECIES: #29 Elliottia racemosa Ell.; Common southern plume

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		(NA) X	(NA)X	(NA)X			X	
Damage	X							
No lasting effect								?
Beneficial if done properly					X	X		

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—



MAP 29. ELLIOTTIA RACEMOSA

## ERIOCAULACEAE

Eriocaulon kornickianum Van Heurck & Muell. - Arg.: Small-headed pipewort

### Technical Description

The plants low, probably short-lived, perennial herbs forming small rosettes or tufts of rosettes.

Leaves.--Pale green, smooth, thin, linear-attenuate, 1-5 cm long, the clasping bases pale, spongy.

Inflorescence.--Scapes at maturity are very slender, 5-9 cm long, about 0.5 mm broad, twisted, 3-4 ridged, sleeved at base by sheaths about as long as leaves and which have loose, paper, bifid summits. Inflorescence subglobose or short oblong involucrate head of chaffy bracts and unisexual florets, 3-4 mm broad and gray or gray-green save for pale "rims" of the white-ciliate perianth parts and bracts and the pale, thin, outer bracts. Bracts forming the involucre broadly oblong to suborbicular, reflexed at maturity, 1.0-1.3 mm long, smooth, translucent, apex rounded. Bracts of receptacle oblong or wedge-shaped, about 1.5 mm long, gray or gray-green, acute or obtuse angled, concave, keeled, marginally with a scattered fringe of club-shaped pale hairs.

Flowers.--Male flower with sepals linear curvate, concave, ca. 1 mm long, grayish-translucent, usually with a few, white, club-shaped hairs on the backs apically. Corolla members 2, subequal, yellowish, fused below to a club-shaped androphore (supports stamens), each corolla lobe with a black gland and a terminal tuft of club-shaped, white hairs. Female flower with 2, linear-curved sepals about 1 mm long, gray translucent, tipped with short, white hairs or smooth; petals 2, spatulate, curved, blades broadly rhombic and opaque, bases clawed, the whole petal yellowish-white and trichome-tipped.

Fruit.--Seeds broadly ovoid, about 0.5 mm long, deep reddish brown, finely papillate or rugose.

### Distribution and Flowering Season

Upland seeps, bogs, from Interior Highlands (Magazine Mountain, Arkansas), south and west into Oklahoma and Texas; Piedmont of Georgia. Flowering July, August.

### Special Identifying Features

Eriocaulaceous plants are distinctive, but difficult to identify to species because most of the taxonomy involves characteristics of the tiny florets, bracts and seeds. This species looks most like E. ravenelii of the eastern Coastal Plain, but is smaller, has more trichomes on its bract and perianth margins, and has a distinctively different seed coat. The ranges of the two in no way overlap.

## Habitat and Management Implication

E. kornickianum is known but from a few widely scattered localities and is very scarce even in the collections of larger museums. Invariably it is in permanently moist to wet, boggy sites, usually upland seeps, and in full sun. These seeps have a sandy base, are typically along small streams (sometimes intermittent) that drain areas of oak-pine forest or oak-hickory uplands. They are in a delicate balance with grasses, sedges, *Rhexias*, *Ludwigias* and rushes, being found in areas where organic sands form small openings of "wash", or in areas of thin, moist soil over sandrock. Site preparation involving any drainage would eliminate these plants. The locality I observed (atop Magazine Mt.) is so small that a single errant bulldozer could eliminate the entire population. Thus, if some trees were carefully removed so as not to disturb the soil, this species might increase by the opening up of some additional sunlit area; extreme care would be necessary. This is truly one of the rarities of the South.

## Suggested Reading

Kral, R. 1966. Eriocaulaceae of continental North America north of Mexico. *Sida* 2(4):285-332.

Moldenke, H. N. 1937. Eriocaulaceae. *N. Amer. Fl.* 19(1).

Small, J. K. 1933. *Manual of the southeastern Flora*, pp. 257-258.

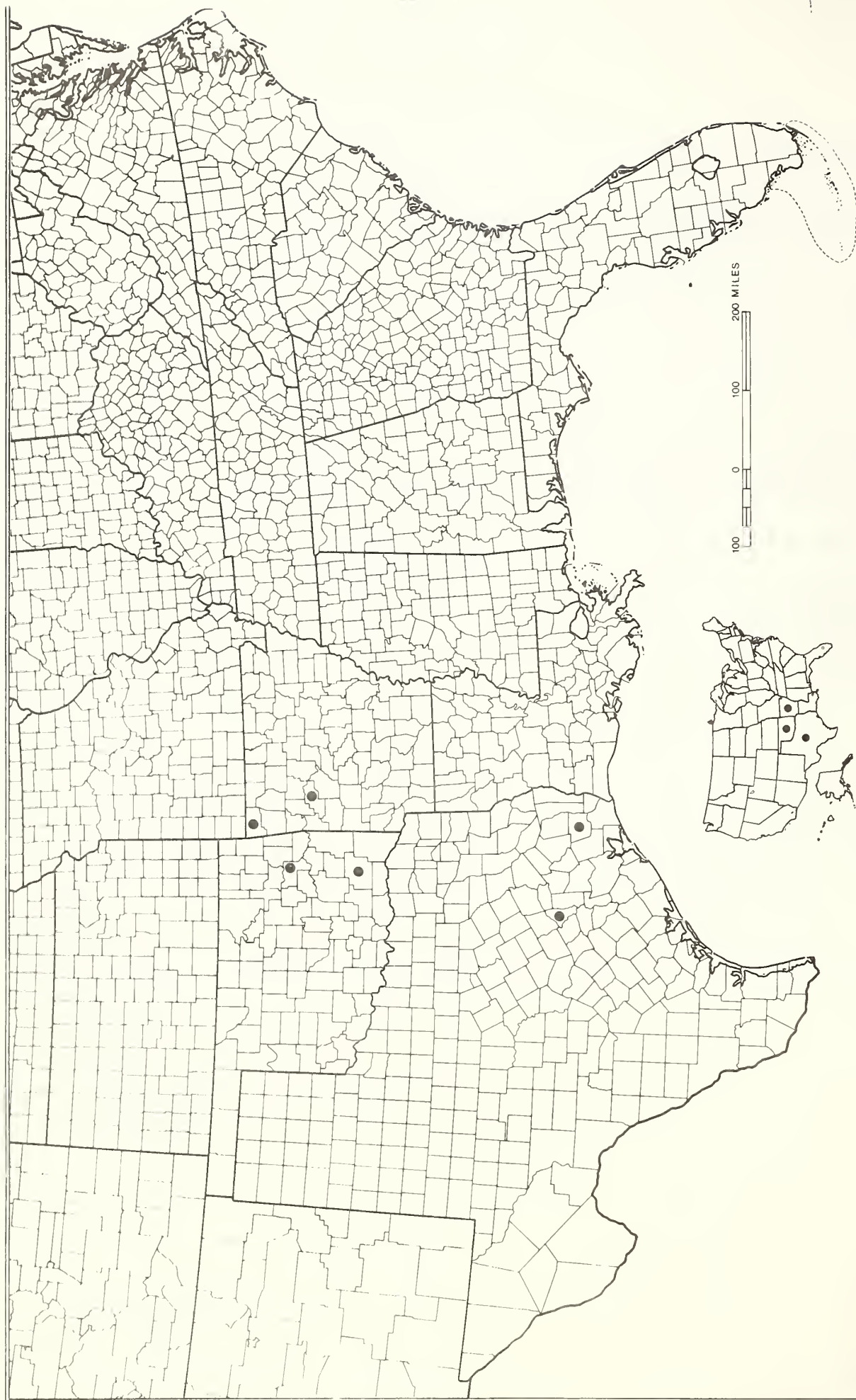
SPECIES: #31 Eriocaulon kornickianum Van Heurch & Muell. - Arg.; Small-headed pipe-wort

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy	(NA)	X	X	X			X	
Damage								
No lasting effect								
Beneficial if done properly					X	X		

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Prescription burns on a typical site would be difficult if not impossible. Therefore, this management practice for the most part does not apply to this species.



MAP 31. *ERIOCAULON KORNICKIANUM*

FABACEAE

Apios priceana B. L. Robins.; Price's groundnut

Glycine priceana (Robins.) Britton

Herbaceous perennial vine from a stoutish, thickened tuber.

Stems.--Twining, also somewhat twisted, terete and also low-ridged, yellow-green or tan, smooth or with a scattering of stiffish hairs, forming a large vine.

Leaves.--Alternate, the stipules linear with a round attachment scar, odd-pinnately compound, mostly 2-3 dm long, spreading on slender but stiffish sparingly pubescent petioles one-third to one-half the length of the leaf; leaflets on stalks 3-5 mm long, spreading, 5-9, mostly 7, broadly to narrowly ovate, the lowest pair usually the largest, acuminate, entire, the bases rounded, the upper surface at maturity smooth, dark yellow-green, reticulate, the lower surface paler, puberulent, reticulate veiny.

Inflorescence.--All but the lower leaves bear rather compact panicles or racemes 5-9 cm long on stoutish, hairy stalks 3-4 cm long. Flowers one or more in axils of pale green ovate, hairy, acuminate bracts, on pedicels 3-5 mm long, in total length about 2 cm.

Flowers.--Calyx a thin, pale green, villous cup ca. 3-4 cm high, this bearing at its lower edge a very narrow projecting lobe about 3 mm long. Corolla as in pea or bean, greenish brownish with maroon tints, when viewed from the side strongly curved outwardly below, concave on the keeled greenish-yellow standard blade above, with the broad standard blade folded over most of the rest of the corolla and longest, its tip fleshier than the rest, beak-like, its base short-auricled; wings oblong linear, short-clawed, each bearing a short auricle basally. Keel petals rather fleshy, strongly curved upward and linear, blunt, shortclawed.

Fruit.--Pods 13-20 cm long, linear, somewhat turgid, the base cuneate, the apex abruptly attenuated into a prominent slender beak, the surface smooth, the valves firm with somewhat thickened margins. Beans oblong, smooth, dark brown, 7-8 mm long.

Distribution and Flowering Season

Rocky, wooded slopes and floodplain edges, middle Kentucky southward through middle Tennessee to northern Alabama and northeastern Mississippi. Flowering late June and July, fruit maturing in August.

Special Identifying Features

This plant is distinguished from A. americana Medic as follows:

1. The leaves are larger, the leaflets usually with one pair more.
2. The standard petal (uppermost petal) is larger, more yellow-green than purplish-maroon (as in A. americana), bearing at its tip a thickened, mucro-like appendage. In A. americana the standard tip is blunt, even emarginate.

3. The fruits are longer, the shorter ones about equal to the longest ones produced by A. americana.

#### Habitat and Management Implication

A. priceana is usually found under mixed hardwoods or clearings therein, usually where ravine slopes or banks break into creek or river bottoms. It is on well-drained loams either on old alluvium or over limestone.

This is such a rare plant that nothing is now known for sure of its response to disturbance, grazing, etc. It has been collected in secondary hardwood forests, thus is known to survive in the wake of logging. Its large rootstock (recorded, according to Gleason, 1952, as reaching 18 cm in breadth) should give it considerable competitive advantage. However, the very rarity of the plants indicate a narrow ecological amplitude.

#### Suggested Reading

Gleason, H. A. 1952. Illustrated flora, ed. 3, vol. II, pp. 448-449.

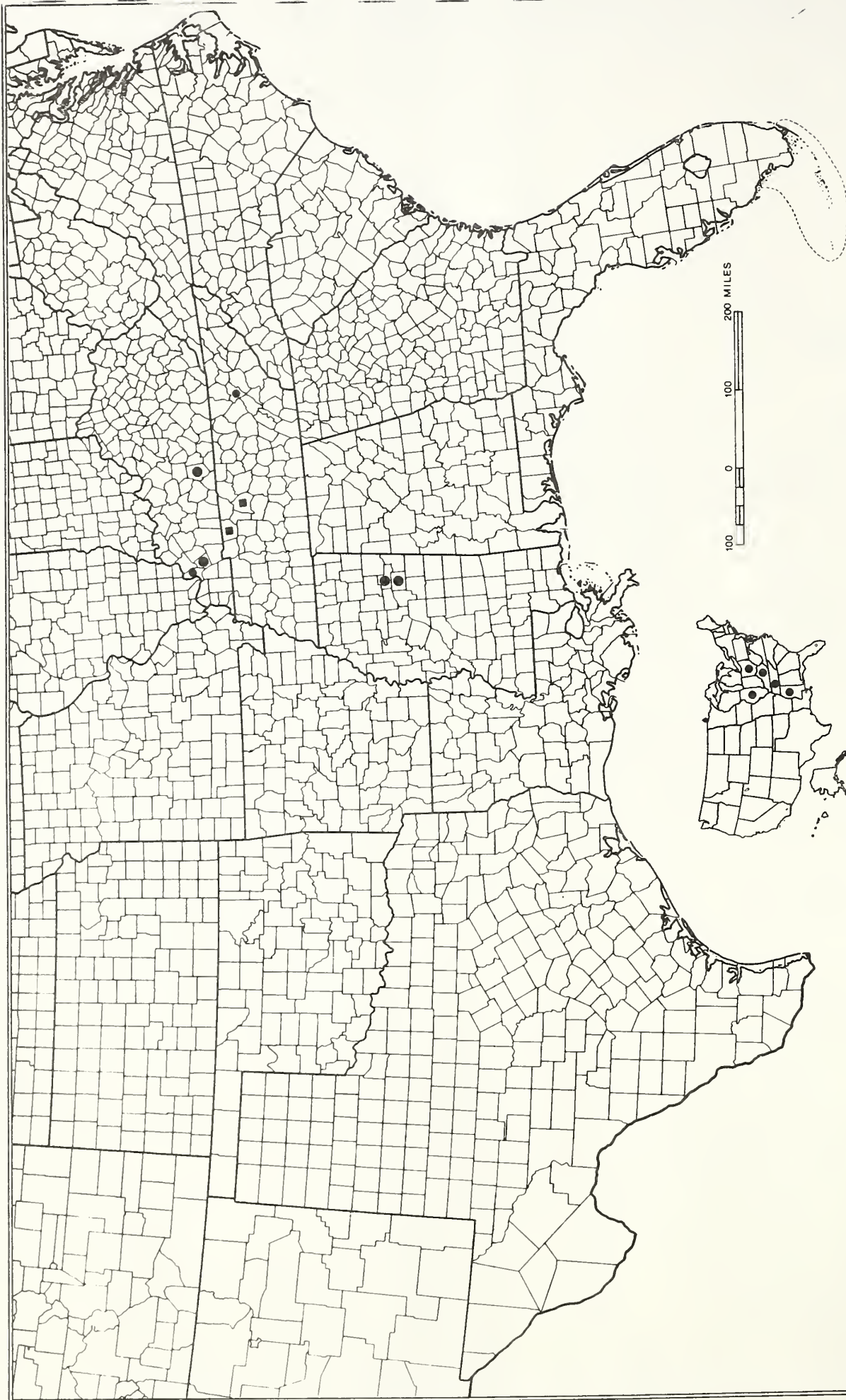
Small, J. K. 1933. Manual of the southeastern flora, pp. 723.

SPECIES: #33 Apios priceana B. L. Robins.; Price's groundnut

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		X				X	X	
Damage								X
No lasting effect	NA				X			
Beneficial if done properly								

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—



MAP 33. *APIOS PRICEANA*

FABACEAE

Petalostemum foliosum A. Gray; leafy prairie-clover

Technical Description

A smooth perennial.

Stems.--The slender but firm, rounded stems to 1 m tall, one to several, erect to ascending, simple or branching above from a deep, simple or branched taproot.

Leaves.--Lowest leaves usually absent by flowering time, those toward mid and upper stem rather uniform in size, alternate, numerous, spreading, with slender, sharp-pointed brownish stipules, even-pinnate, oblong in outline, mostly 4-7 cm long and to 2 cm broad, the leaflets mostly 6-15 pairs, elliptic or oblong, 3-10 mm long, mucronate, entire, short-stalked, the surfaces and that of the rachis gland-dotted, the petiole short.

Inflorescence.--Flowers small, mostly about 5 mm long, densely crowded in a cylindrical, terminal spike up to 7 cm long, this on a peduncle usually shorter than the subtending leaf.

Flowers.--Calyx short-tubular, the 5 lobes unequal, narrowly triangular. Corolla of 5, unequal, pale purple petals, these slightly spreading. The stamens are 5, usually with the filaments fused into a thin cylinder above the middle, sometimes with an additional petal-like appendage; the flowers in the mass are quite showy.

Fruit.--Legume short-oblong, concealed in the calyx, few-seeded.

Distribution and Flowering Season

P. foliosum is found discontinuously in limerock districts from Illinois southward to northern Alabama. It blooms from late June through August.

Habitats and Management Implication

This species, now believed to have been destroyed in its Illinois range, is locally abundant in the limestone glades of middle Tennessee. Invariably it avoids the drier areas, but is always in openings of cedar glades which are dry most of the growing season. Thus, one looks for it where there are shallow, moist depressions, these filled with transported clay and providing sufficient soil depth for the extensive taproot; it also grows along shallow streams traversing open glades. As such situations also provide sufficient site for shrubby and arborescent species, and as P. foliosum is a plant of clearings, populations of it give way ultimately in succession to the encroaching hardwoods or to the shade of junipers. The species, apparently never common, was probably maintained in nature through creation of clearings through fire, through blowdowns or diebacks of overstory, or through establishment of comparatively "closed" grass-form communities where sufficient soil could accumulate in depressions in the flat, bedded limestone.

156  
Clearcutting of cedar, which is almost invariably the commonest species of tree in the area, if unaccompanied by radical alteration of the soil, would probably encourage increase of this species, as would selective logging sufficient to create substantial openings. Controlled burning would affect it little and fire may once have been a factor in maintaining "natural" clearings in the area. Site manipulations which reduce soil moisture (such as ditching to speed or improve drainage) would eliminate the species. The species appears to be absent in areas where cattle graze (even where the site once must have been favorable for it). This is a strong indication that it can stand little browse impact.

#### Selected Readings

Hill, E. J. 1879. The geographic range of Petalosteman foliosus Gray in Illinois. Bot. Gaz. 4:239-240.

Small, J. K. 1933. Manual of the southeastern Flora: 695-697.

Revised March 1980

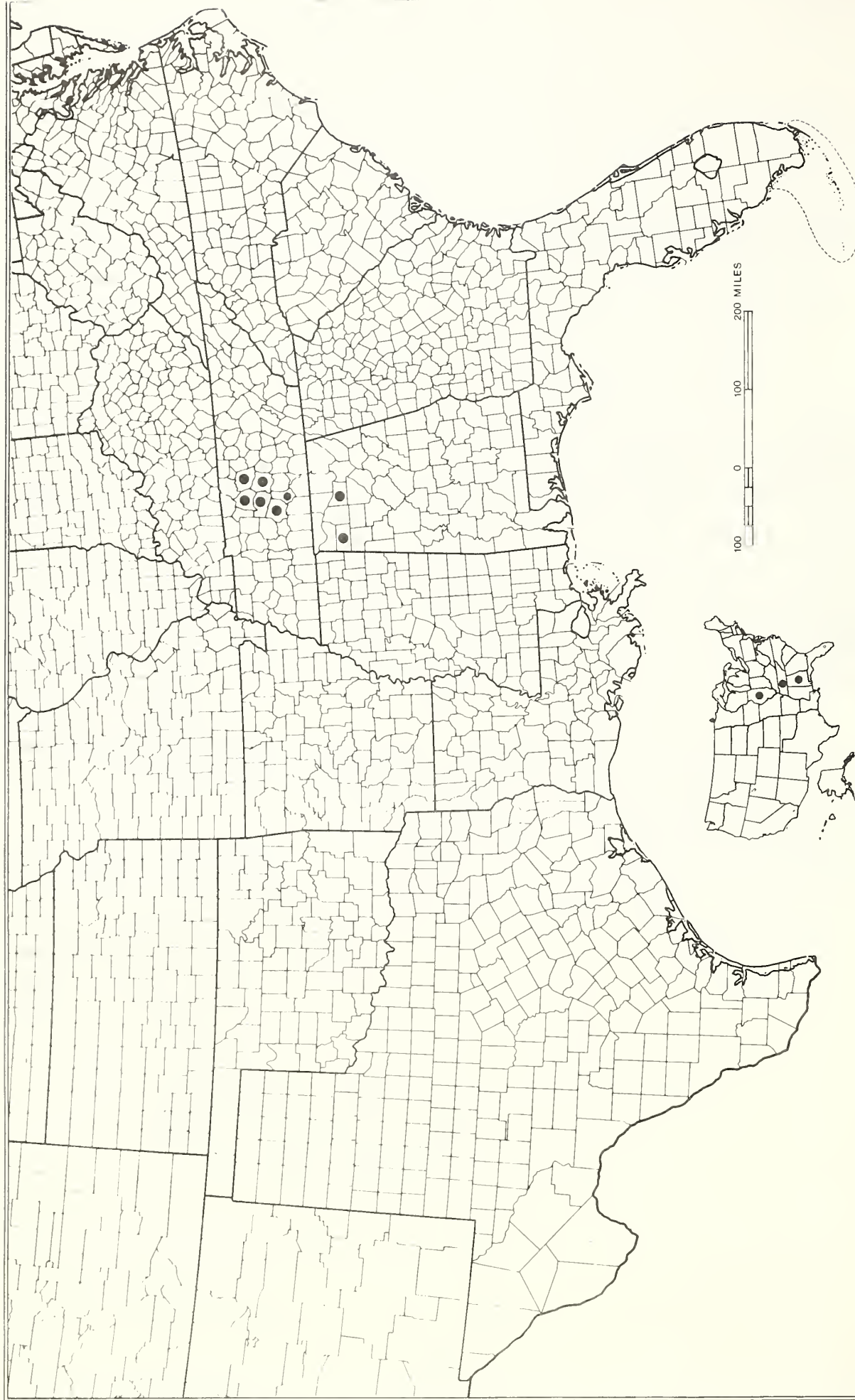
SPECIES: #35 Petalostemum foliosum A. Gray; leafy prairie-clover

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		X	X	X				
Damage							X	X
No lasting effect								
Beneficial if done properly	X				X	X		

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980



MAP 35. PETALOSTEMON FOLIOSUM

ASTERACEAE

Silphium integrifolium Michx. var. gattingeri Perry;  
Entire-leaved rosinweed

Technical Description

Thick-rooted perennial from a stout erect rhizome (caudex).

Stems: Mostly erect, mostly between 1 and 2 meters tall, terete, slightly fluted, smoothish, pale green with tints of brown or brownish toward base, sometimes slightly glaucous.

Leaves: Mostly opposite, the blades lanceolate to ovate, the lowest largest, mostly 10-20 cm. long, very firm, sessile above, short-petiolate toward stem base, acute, the margins scabrid, also entire, denticulate or finely to coarsely serrate, the upper surface smooth to scabrid, the lower surface paler, smooth to scabrid.

Inflorescence: Heads usually numerous, in diffuse to compact cymes, the branches spreading-ascending, stiffish. Fruiting involucre broadly cup-shaped, 1.0-1.5 cm. high, 2.0-3.0 cm. broad; phyllaries rather loose, often spreading, mostly elliptic or broadly to narrowly obovate, multi-ribbed, greenish, rounded, the margins stiffly ciliate, the backs smooth; pales (chaff) if outermost similar to inner bracts, progressively narrower toward head center, all strongly upwardly ciliate-margined.

Flowers: Ray florets fertile with blades narrowly oblong or linear, 3.0-3.5 cm. long, bright yellow. Disc florets sterile, the tubular corollas strongly nerved, with short-triangular, bristly-hairy, yellow lobes.

Fruit: Akene broadly obovoid, fully 1 cm. long, flattened parallel to head axis, broadly winged (wing between 1 and 2 mm. wide), this notched 2-4 mm. deep at akene apex and there produced laterally into 2, triangular-acuminate, even subulate, tips, the margins entire or sparsely ciliated apically, the backs smooth or with a scattering of short hairs apically.

Distribution and Flowering Season

Rocky, usually calcareous, clearings, middle Tennessee; flowering July into September.

Special Identifying Features

Perry (1937) described this variety from a single specimen (Tennessee. Davidson County: Charlotte Pike, Nashville, July, 1886, Gattinger) which this writer has not seen. However, other plants fitting the rather brief description are to be found in counties of middle Tennessee. There does exist some doubt as to the distinctness of this variety, at least as to its position in the genus. S. integrifolium is supposed to be distinguished by its being part of a complex which has leaves not connate-perfoliate, by its leafy bracted involucre, by

its unlobed stem leaves which are sessile or short-petiolate, and by its broadish akene wings. While most S. integrifolium has involucral bracts that are mainly scabrous pubescent, this has glabrous bracts and the wing-tips of the akenes are drawn out into narrow stiff tips. Unfortunately for this taxonomy, S. trifoliatum var. latifolium is supposed to be part of another complex on the basis of its narrower akene wings, yet has examples which have wing widths overlapping that of S. integrifolium, and otherwise has characteristics that could include S. integrifolium var. gattingeri. Thus, this should be included here only as a doubtful taxon whose characteristics are shared by at least two species.

#### Habitats and Management Implication

This plant frequents the rather heavy, seasonally dry, clays derived from underlying limestones of middle Tennessee. It is usually in limerocky clearings amidst oaks such as Quercus stellata, Q. shumardii, Q. muhlenbergii, Q. imbricaria, etc., hickories such as Carya ovata, C. carolinae-septentrionalis, C. ovalis, and a scattering of juniper, white ash, blue ash, September elm, American elm, slippery elm, Forestiera ligustrina, Rhus spp. and Rhamnus caroliniana. In the clearings it is usually in grasses such as Andropogon spp., Panicum virgatum, Sorghastrum, Sporobolus and with forbs such as other composites, Petalostemon, several Lespedeza and Desmodium, Sabatia angularis, Lobelia spicata, etc.

Single tree or group selection might be recommended for the surrounding forest, in any event probably favoring increase of this species in clearings. There is some history of fire in the area, this again favoring increase. Grazing tends to reduce it except along fencerows.

#### Reference

Perry, Lily M. 1937. Notes on Silphium. Rhodora 39: 281-297.

Revised March 1980

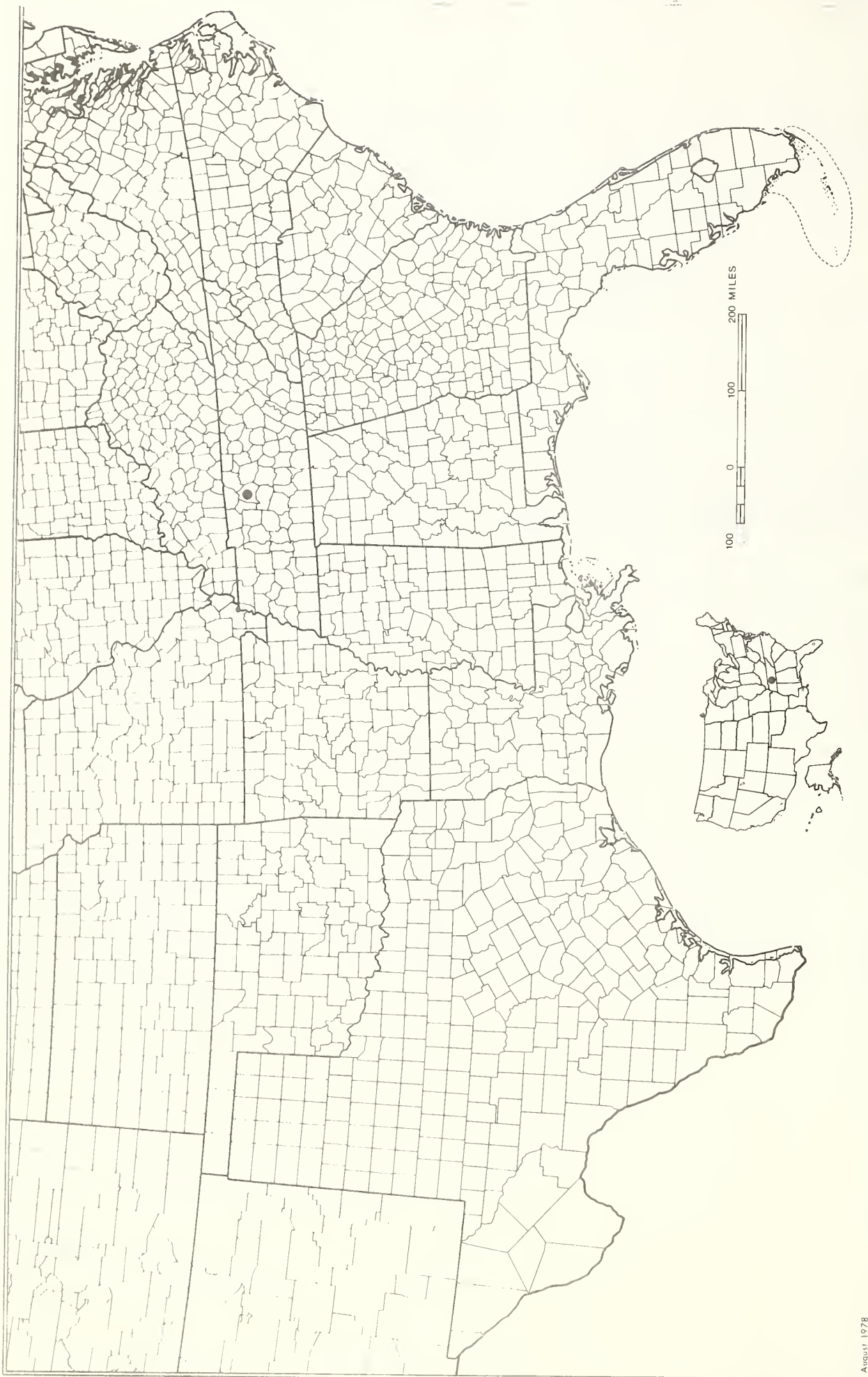
#39 Silphium integrifolium Michx. var. guttingeri Perry;  
 SPECIES: Entire-leaved rosinweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	?				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 39. *SILPHIUM INTEGRIFOLIUM GATTINGERAE*

## ASTERACEAE

### Solidago shortii T. & G.; Short's goldenrod

#### Technical Description

Perennial from a thickened caudex arising from ascending rhizomes.

Stems: Either erect (if solitary) or ascending with decumbent bases and forming clumps, up to 1.5 meters tall, usually 1 meter or less, yellowish-green or tinged with tan, terete but longitudinally grooved, minutely scabrid-puberulent from at least the middle up, the hairs appressed and pointing upward.

Leaves: Lower leaves absent by flowering time, of those present the lowest smaller than those of about mid-stem, these elliptic-linear, rarely oblanceolate, mostly 5-10 cm. long, rather close-set, ascending or erect, firm, acute and hard-mucronate, the margins distantly low-serrate, the bases attenuate and sessile, the surfaces smooth, yellow-green, strongly 3-nerved. Leaves progressively shortening upward into the inflorescence, becoming elliptic, bracteal, 1 cm. long or less.

Inflorescence: Heads short-stalked unilateral along the inflorescence branches (secund), the whole inflorescence nodding-tipped with the larger branches having recurved tips. Stalks of heads puberulent, mostly less than 5 mm. long, with short-linear, overlapping bracts. Involucres in flower narrowly campanulate, 4-5 mm. high (including pappus), about 3 mm. across, the phyllaries (bracts) several, spirally loosely imbricate, the shortest outermost, the longest ca. 3 mm. long, oblong, acutish, ciliate, yellow-green smooth, with a darker midrib.

Flowers: Rays (3-) 4-8, the corollas elliptic-linear, with ligules around 2 mm. long, spreading, bright yellow. Disc florets about equalling rays in number, the tube short, the throat funnelform, the 5 lobes linear, spreading, about as long as the throat.

Fruit: Akenes cuneate-cylindric (somewhat broadened upwardly), about 2 mm. long, pale brown, minutely upwardly pubescent; pappus capillary, white, about 2 mm. long.

#### Distribution and Flowering Season

Dryish, calcareous clearings, middle Kentucky in the vicinity of Blue Licks; the Falls of the Ohio River near Louisville. Flowering in September.

#### Special Identifying Features

This species is in that complex of the genus including S. rugosa (incl. S. altissima L. of some authors), S. canadensis, S. radula which combine at least some stem hair with strongly triple nerved stem leaves. However, of these S. shortii is the only one with a combination of narrow, smooth leaves, scabrid puberulence, and few florets. Similar as the species is to some others, it consistently retains its combination of characteristics over its restricted range.

## Habitats and Management Implication

The populations at and around Blue Licks are all in rather dry sites, rooted in clay over limestone and amidst limerock boulders and outcroppings. They are either in large, gladey clearings or in open woodlands made up of Post Oak, Shumard Oak, White Oak, Yellow Oak, Shingle Oak, various upland hickories, White Ash, Redbud, Cornus, mixed with a liberal scattering of Eastern Red Cedar. The clearings themselves have a mixture of grasses including Andropogon, Aristida dichotoma and A. oligantha, annual dropseeds, Panicum flexile, Isanthus, Eupatorium altissimum and various other Solidago, particularly S. nemoralis. Most of the hardwood growth is low-grade and would be considered barely marginal from a logging standpoint.

Improved woodland pasture of contiguous areas shows none of this goldenrod. Where roads pass through, the species has spread locally onto the shoulders, an indication that logging disturbance creates openings it will occupy. No remarks are possible as to its reaction to mechanical site preparation, which is probably impractical because of the rocky and thin character of the soils on these sites. The species probably has maintained historically either through occupancy of areas where soil has been eroded to expose limestones or through periodic natural fires, these in either event creating small clearings or opening the stand.

## References

- Torrey, J. R. and A. Gray. 1838 - 1842. Flora of North America 2: 222.
- Small, J. K. 1933. Manual of the southeastern Flora: 1200.

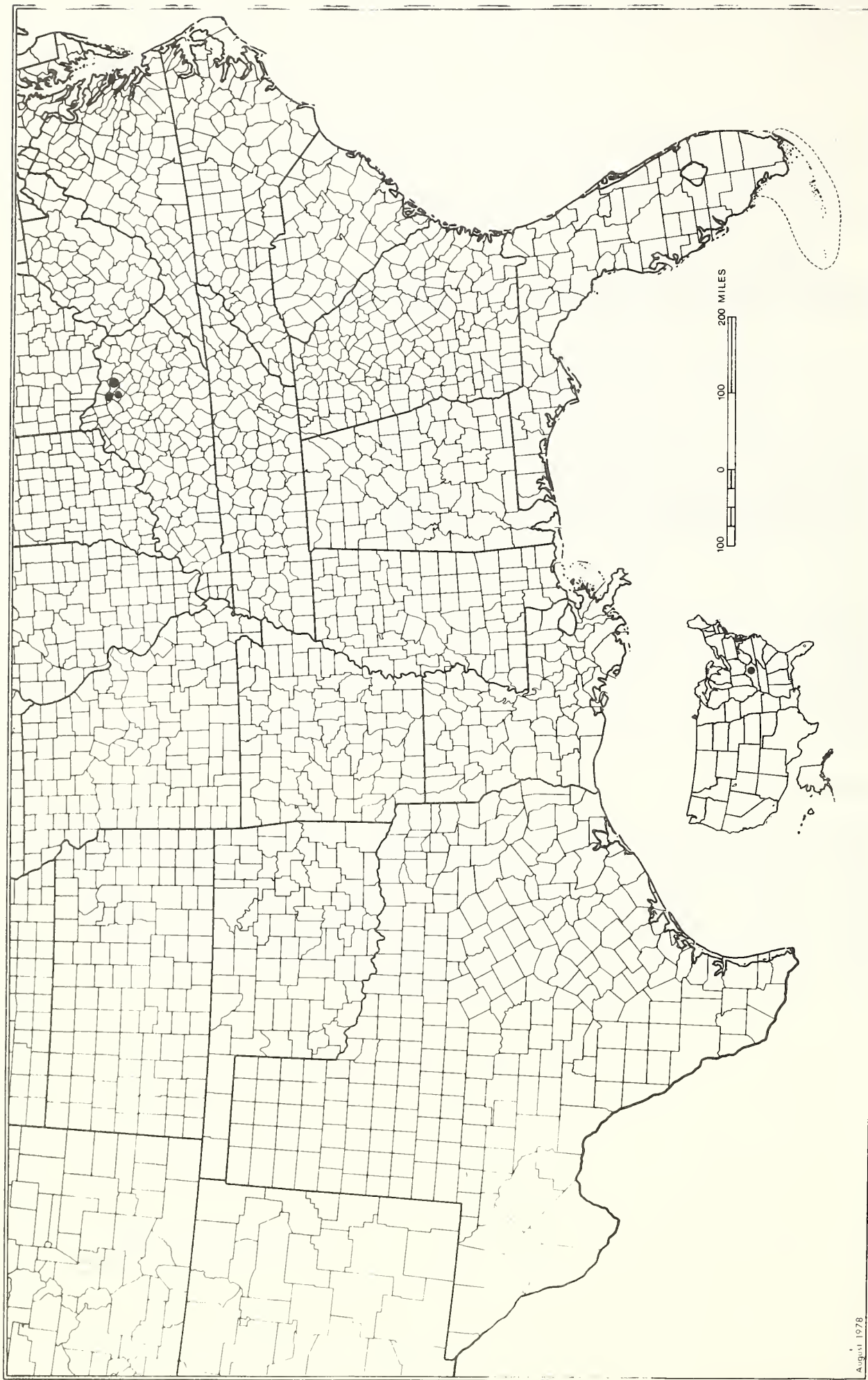
SPECIES: #40 Solidago shortii T. & G.; Short's goldenrod

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage	X							X
No Lasting Effect		NA						
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 40. *SOLIDAGO SHORTII*

BRASSICACEAE

Arabis perstellata Braun; prairie rock-cress

Technical Description

Perennial, arising from overwintering rosettes, these forming as slender, leafy shoots from bases of previous years' stems.

Stems.--At flowering time erect or ascending, but from decumbent bases, one to several from withering rosettes, 1-8 dm long, terete, pale yellow-green with abundant white-stellate hairs.

Leaves.--Of rosettes and sterile leafy shoots long-petiolate, blades mostly obovate or oblanceolate, 4-15 cm long, apically acute to broadly rounded, the margins ranging from lyrate-pinnatifid (in earliest, oldest rosette leaves) with lowest segments linear, to coarsely dentate, serrate-dentate, saliently narrowly toothed or nearly entire, in any event narrowing attenuately to nearly the petiole base, thin, the surfaces yellow-green, with the upper and lower both evenly stellate-puberulent. Stem leaves abruptly shorter, the smallest lowest, the largest at mid stem or above, mostly oblong, narrowly elliptic, or oblanceolate, apically narrowly to broadly acute, the margins from nearly entire to closely or distantly toothed or denticulate or (in lowest) pinnatifid, the bases auriculate clasping, the surfaces as in the rosette leaves.

Inflorescence.--Upper 1/2 to 1/3 of stem naked, developing into a variously elongating raceme. Flowers symmetrical, on spreading, slender but stiffish, stellate-hairy pedicels to 4 mm long.

Flowers.--Sepals 4, ascending or spreading, oblong-lanceolate, boat-shaped, 2-3 mm long, the backs stellate-hairy, pale green with tints of lavender. Petals 4, clawed with elliptic, erose blades, 3-4 mm long, ascending, the blades pale lavender with deeper colored veins, the claws white. Stamens 6, 2 shorter, filaments flattened and ascending, anthers yellowish, oblong, ca. 0.5 mm long, erect.

Fruit.--On spreading stalks that elongate with age fully to 1 cm or more, linear, straight, to 2 cm long, about 1 mm broad, longitudinally parallel-veined, flattened between the seeds, the surfaces with a mixture of simple and stellate hairs. Seeds oblong, ca. 1 mm long, somewhat flattened, reddish-brown, wingless, the coat in places minutely hairy.

Distribution and Flowering Season

There are two varieties, both extremely local. The var. perstellata is found on wooded hillsides along Elkhorn Creek in Franklin County, Kentucky. Its fruiting stems may reach 4 dm, its larger leaves with blades rarely longer than 4 cm. The variety ampla Rollins, is much taller, ranging from 4 to 8 dm and with larger, broader, basal rosette leaves (8-15 cm long). So far, this variety is known only from a single calcareous bluff system above the Stones River (this place now Percy Priest Lake, a Corps of Engineers project), northeast of Una, in Davidson County, Tennessee. Both varieties flower in April and May.

### Special Identifying Features

Both varieties may be confused with A. shortii (Fern.) Gl., but that species has upper surfaces of leaves either smooth or with simple hairs, shorter stalked fruit, and smaller, whitish or very pale pink petals.

### Habitats and Management Implication

Both varieties are found on blackish, clay loams over limestone, on limestone ledges, or amidst limestone boulders in the shade of a hardwood forest (sometimes with a few junipers) made up mainly of various oaks, ash, hickory, redbud, sugar maple and Rhus. Associated herbs are mostly spring flowering perennials such as Dentaria, Hepatica, Phacelia pinnatifida, Hydrophyllum macrophyllum, etc. Arabis laevigata is local throughout. Braun (1940) indicates that A. perstellata and A. laevigata will hybridize, but no such observations thus far have been made in Tennessee.

In that the plants are in steep, wooded hillsides and bluffs, the habitats would be modified drastically by clearcutting, through admission of light, drying, and erosion during the wet cycles. Careful logging involving single tree or group selection might have the least impact. However, the total area occupied by both varieties is so small and the habitats so sensitive that every effort should be made to preserve them intact. The Tennessee population has been reduced through a damming up of the Stones River, thus inundating the lower reaches of the bluffs it frequents.

### Selected Readings

- Braun, E. L. 1940. New plants from Kentucky. *Rhodora* 42:47-51  
1956. Growth habits of Arabis perstellata. *Rhodora* 58:292-295.
- Gleason, H. A. 1952. Change of name for certain plants of the "Manual Range." *Phytologia* 4:20-25.
- Hopkins, M. H. 1937. Arabis in eastern and central North America. *Rhodora* 39:167-170.
- Rollins, R. C. 1960. Arabis perstellata in Tennessee. *Rhodora* 62:242-244.

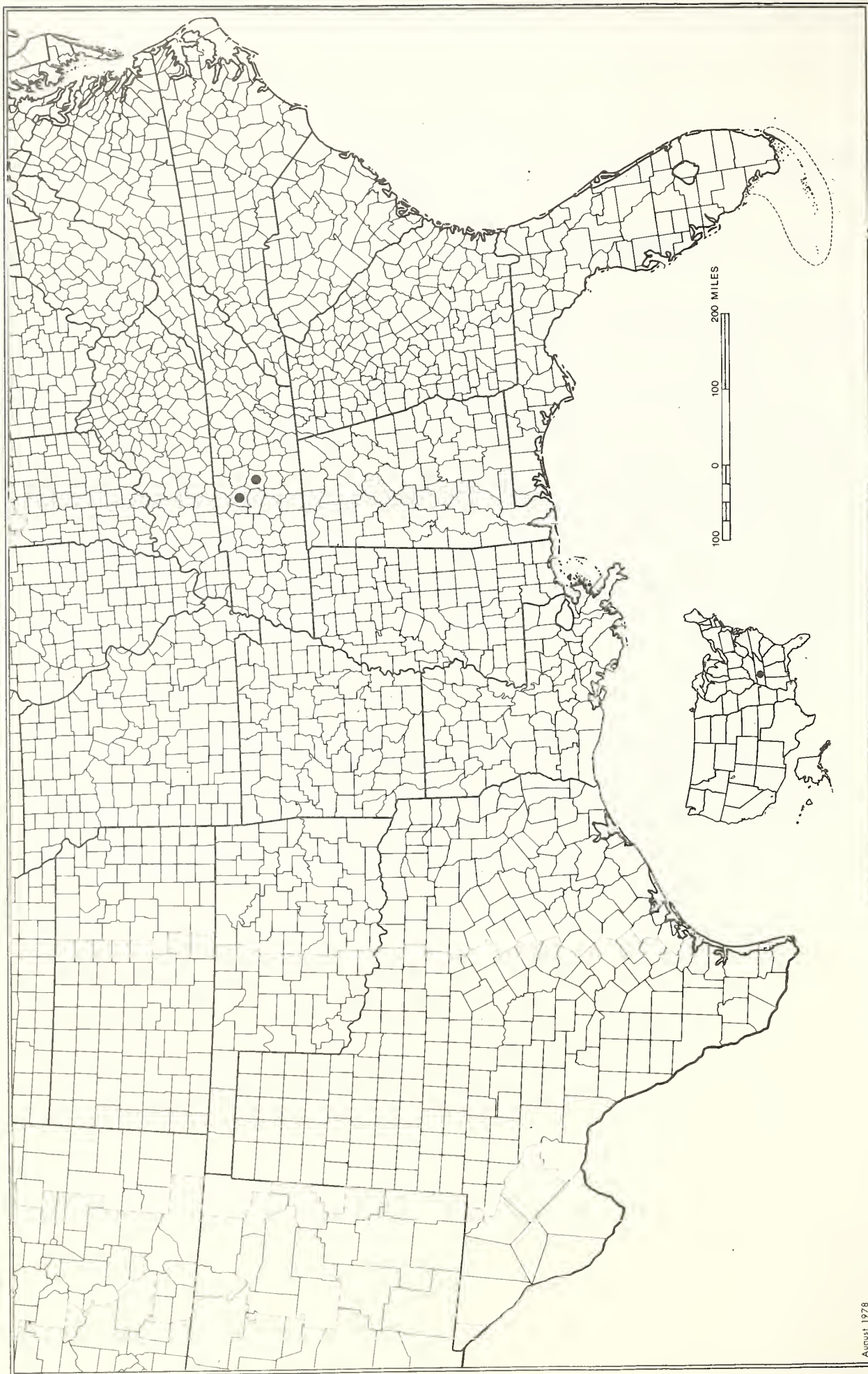
SPECIES: #41 Arabis perstellata Braun; prairie rock-cress

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy						X		X
Damage	NA						NA	
No lasting effect					X			
Beneficial if done properly								

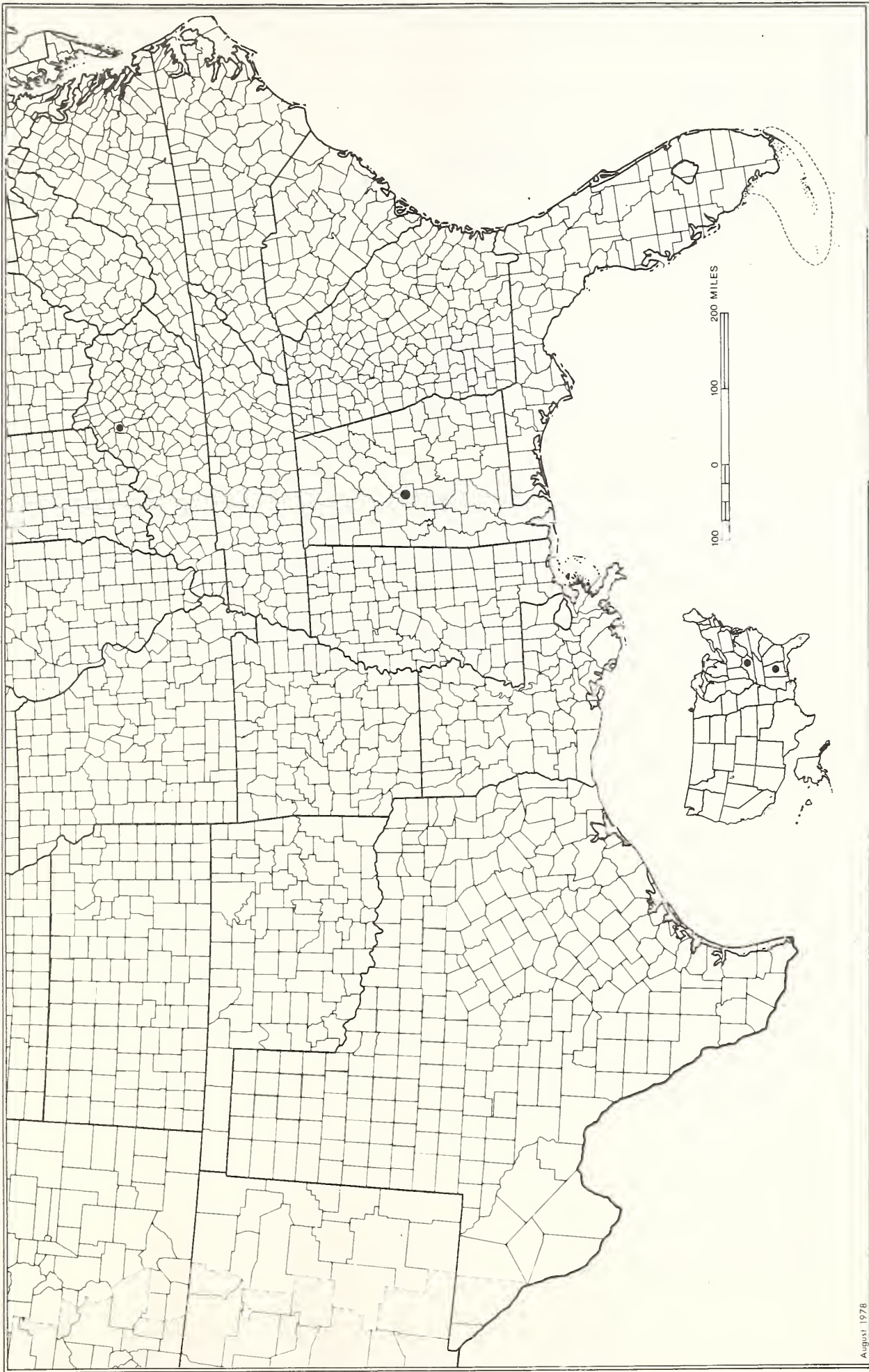
\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

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MAP 41A. *ARABIS PERSTELLATA AMPLA*



MAP 41B. *ARABIS PERSTELLATA PERSTELLATA*



BRASSICACEAE

Lesquerella lyrata Rollins; Lyrate bladderpod

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Technical Description

This herbaceous species resembles L. densipila vegetatively, in type and amount of hairs, in flower size and color, in pedicel and fruit shape. In fact it differs from the latter only in its slightly smaller (2.5-3.0 mm. long) fruit which are, together with the persistent styles, perfectly smooth.

Distribution and Flowering Season

L. lyrata is known only from cedar glade areas in the eastern part of Franklin County in northwestern Alabama. It blooms from late February into late April. Rollins (op. cit.) considers it a morphological-evolutional link between L. densipila of northern Alabama and middle Tennessee and L. auriculata, a species of Oklahoma and eastern Texas.

Land management implications for this species are the same as those for L. densipila and all other Lesquerella of the southeastern area save L. globosa.



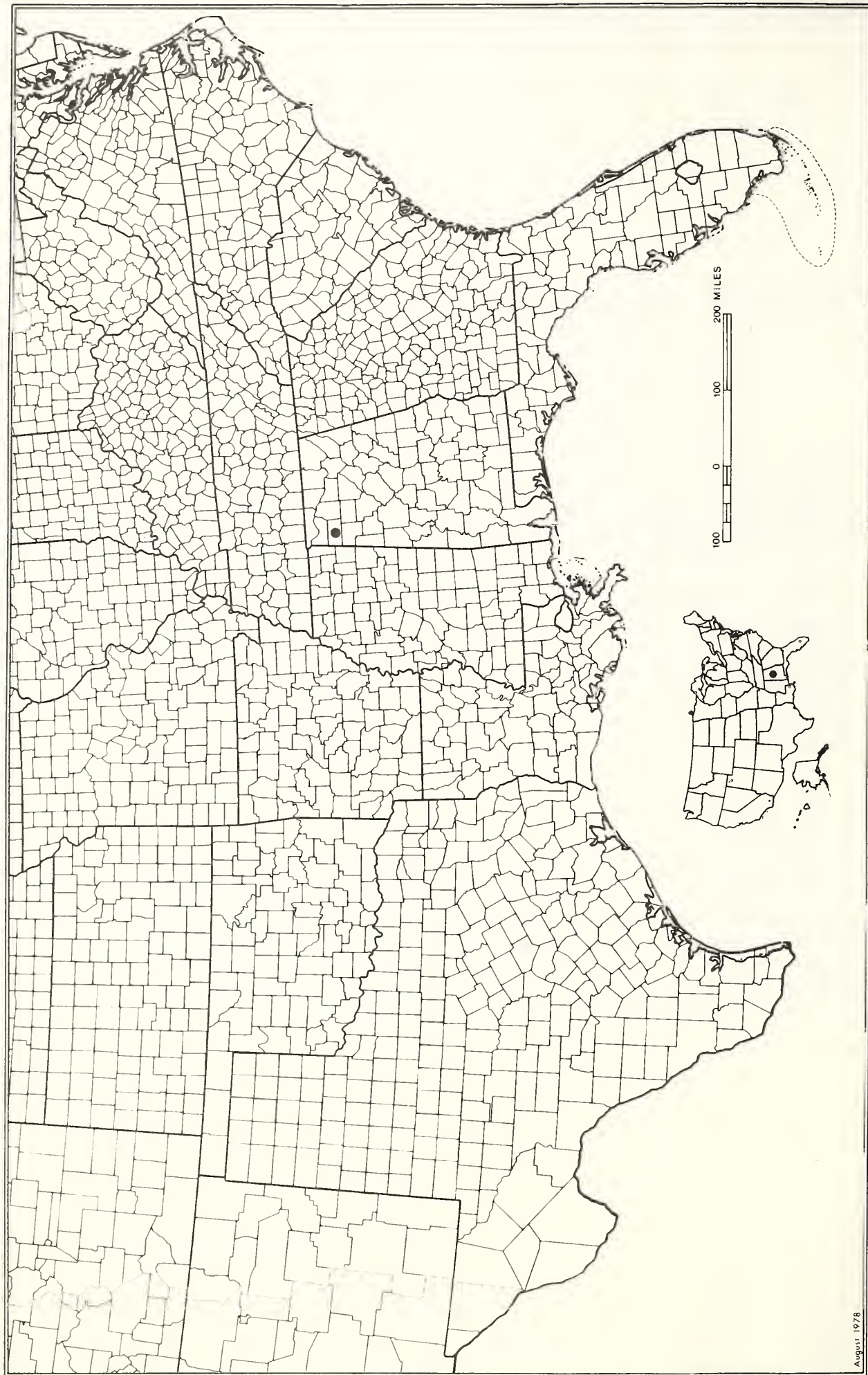
SPECIES: #44 Lesquerella lyrata Rollins; Lyrate bladderpod

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								X
No Lasting Effect	NA							
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 44. *LESQUERELLA LYRATA*

## BRASSICACEAE

Lesquerella perforata Rollins; Spring Creek bladderpod

## Technical Description

Similar in habit to other annual auriculate Lesquerella.

Leaves: Rosette leaves similar, lyrate or runcinate pinnatifid, often absent by height of flowering. Stem leaves oblong to obovate, usually with margins sparingly to copiously dentate.

Flowers: Petals obovate or broadly spatulate, short clawed, 7-10 mm. long, white or pale lavender-bladed, the claw and blade base yellow.

Fruit: Fruit broadly obovoid to obpyriform, very inflated, 4-7 mm. long, the valves smooth to sparingly pilose on the outside, hairy on the inside; septum perforate, nearly absent. Seeds 2-6/locule, 1.5-2.5 mm. long, nearly round, strongly flattened and margined.

## Distribution and Flowering Season

Limestone glades, limerocky pastures, in full sunlight, around Lebanon in Wilson County, middle Tennessee. Flowering from March through April.

## Special Identifying Features

No other species of Lesquerella in the southeast combines this particular petal color with an incomplete septum; only L. stonensis resembles it in flower color.

## Habitat and Management Implication

This species, which may be very abundant locally, is with its showy racemes of fragrant, white to pale lavender-petaled flowers not only striking but surprisingly limited in distribution with no populations known from outside → a radius of 6 miles around Lebanon. It is usually found in well-drained clay loam pockets in rocky clearings and is, like the other auriculate-leaved species, a lower successional level plant that has maintained itself in disturbed situations. Improvement of the pastures it frequents would probably crowd it out, as will the shade influence of woody successional stages.

## References

See references for L. densipila.



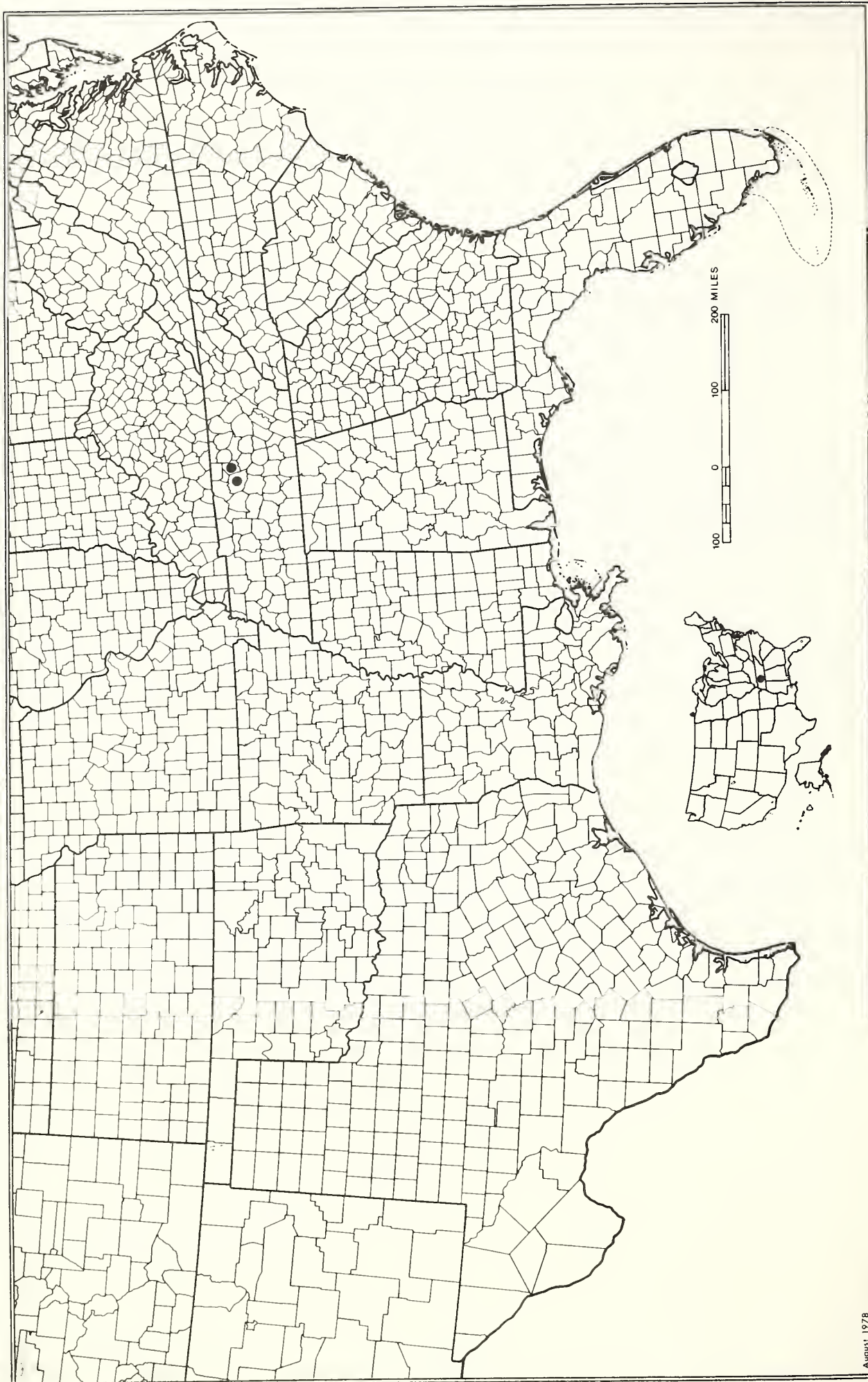
SPECIES: #45 Lesquerella perforata Rollins; Spring Creek bladderpod

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								X
No Lasting Effect	NA							
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 45. *LESQUERELLA PERFORATA*

BRASSICACEAE

Lesquerella stonensis Rollins; Stones River bladderpod

Technical Description

Similar to L. perforata Rollins, differing mainly and significantly in fruit character. The fruit, in shape and character of papery valves not unlike L. perforata, measures 3-4 mm. long by 4-5 mm. wide, is sometimes somewhat bilobed; the valve surfaces are externally densely hairy, internally smooth. The style is hairy, at least toward its base. The septum is complete or somewhat perforated.

Distribution and Flowering Season

This showy species whose flowers, like those of L. perforata, are whitish and fragrant, is thus far known only from the open areas of floodplain of the Stones River near Walterhill. There, particularly in open fields and bottoms, it is locally abundant some years, virtually absent others. It blooms from March through April.

Habitats and Management Implication

It is disturbance-dependent, seeming to maintain its populations in alluvial situations that have recent exposures of heavy alluvium either through cultivation and abandonment or through flood deposition. Development of shrub or forest stages undoubtedly shades it out.

A small park and racetrack by the Stones River, together with a large grassy field comprise most of its area south of the river course. A large cultivated field just north of the river comprises most of its remaining known area. Hybrids between this and L. densipila (L. x maxima) have been discovered shortly downstream.

References

Rollins, R. C. 1955. The auriculate-leaved species of Lesquerella (Cruciferae.) *Rhodora* 57: 241-264.

\_\_\_\_\_ and A. E. Shaw 1973. The genus Lesquerella (Cruciferae) in North America. pp. 1-288. Cambridge, Mass.

Small, J. K. 1933. Manual of the southeastern flora, pp. 555-556.

Revised March 1980



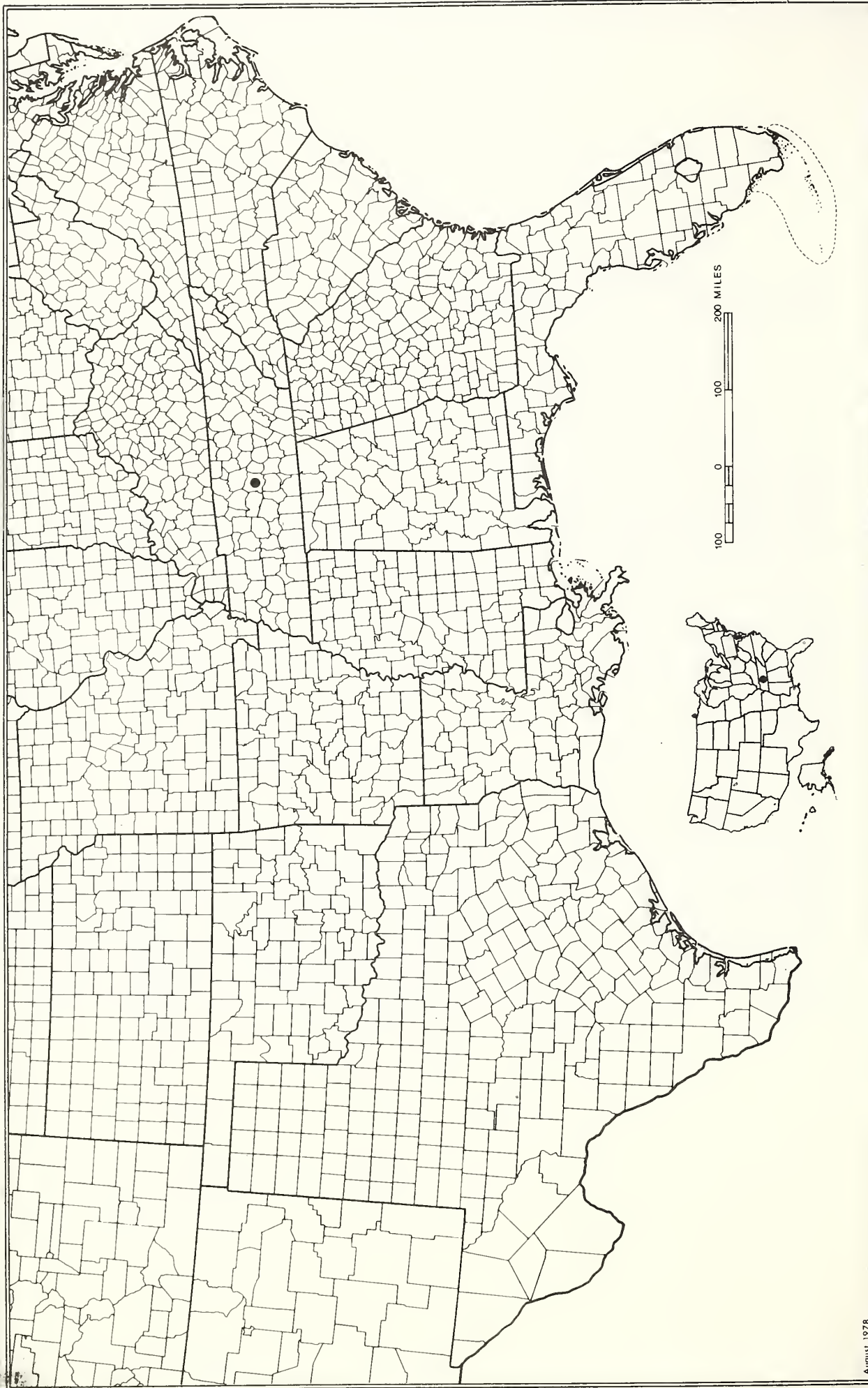
#46 Lesquerella stonensis Rollins;  
 SPECIES: Stones River bladderpod

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								X
No Lasting Effect	NA							
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 46. *LESQUERELLA STONENSIS*

BRASSICACEAE

Warea sessilifolia Nash; Sessile-leaved warea

Technical Description

Smooth annual from a taproot.

Stems.--Mostly 3-10 dm long, erect, terete, slightly longitudinally grooved, slender, but rather stiff, upwardly green, toward base often purplish or maroon, unbranched or ascending-branched from near base or middle upward.

Leaves.--Alternate, close to distant along stems, the lowermost gone by flowering time, the lowest largest, ovate or oblong, mostly 1-3 cm long, ascending, acute, entire, the bases rounded, sessile, dark green or pale yellowish-green.

Inflorescence.--A rather short terminal raceme, this expanding slightly in fruit, the flowers symmetrical, showy in mass, on spreading slender stalks about 1 cm long.

Flowers.--Sepals 4, linear-spatulate, 5-6 mm long, green with reddish or purplish tints, at first erect, becoming reflexed. Petals 4, about 1 cm long, spatulate, with broadly obovate, retuse or emarginate blades and long, slender, minutely scabrid-based claws, bright or pale lavender or lavender-rose. Stamens 6, the slender lavender filaments projecting the linear, often coiled or excurved yellowish anthers beyond the petal tips. Ovary linear, erect on a slender stipe about as long as the petals.

Fruit.--On mostly spreading stalks at least 1 cm long, at tips of stipes at least as long as the stalks, linear, straight or somewhat curved downward, mostly 4-6 cm long, 1-2 mm broad, laterally flattened. Seed flattened, nearly round, about 1 mm long, notched at base, reddish-brown, smooth.

Distribution and Flowering Season

Dry, sandy, open woods, sandhills in the Coastal Plain, northwestern Florida and southeastern Alabama. Flowering mostly in August through October.

Special Identifying Features

This species is closest to W. amplexifolia (Nutt.) Nutt., a plant of similar habitats in eastern peninsular Florida. However, the latter species has definitely clasping-auriculate leaf blades.

Habitats and Management Implication

W. sessilifolia is most common in open sandhill forests populated by stands of longleaf pine-deciduous scrub oak, is particularly abundant in clearings or along the disturbed edges. It may also abound in sandy clearings of the sand pine-evergreen scrub oak type. In both sorts of forests it will quickly occupy areas from which the original woods have been cleared and prepared for planted pine; thus, it behaves as a weed. As the planted or seeded stand develops and as crowns close, it quickly disappears. In that woods fires reduce overstory, fire

tends to increase the species. Grazing reduces it, probably through trampling.

#### Suggested Reading

Channell, R. B. and C. W. James. 1964. Nomenclatural and taxonomic corrections in Warea (Cruciferae). *Rhodora* 66(765):18-26.

Shinners, L. H. 1962. Warea auriculata instead of W. amplexifolia of Small (Cruciferae). *Sida* 1:105-106.

Small, J. K. 1933. Manual of the southeastern flora, pp. 573-574.

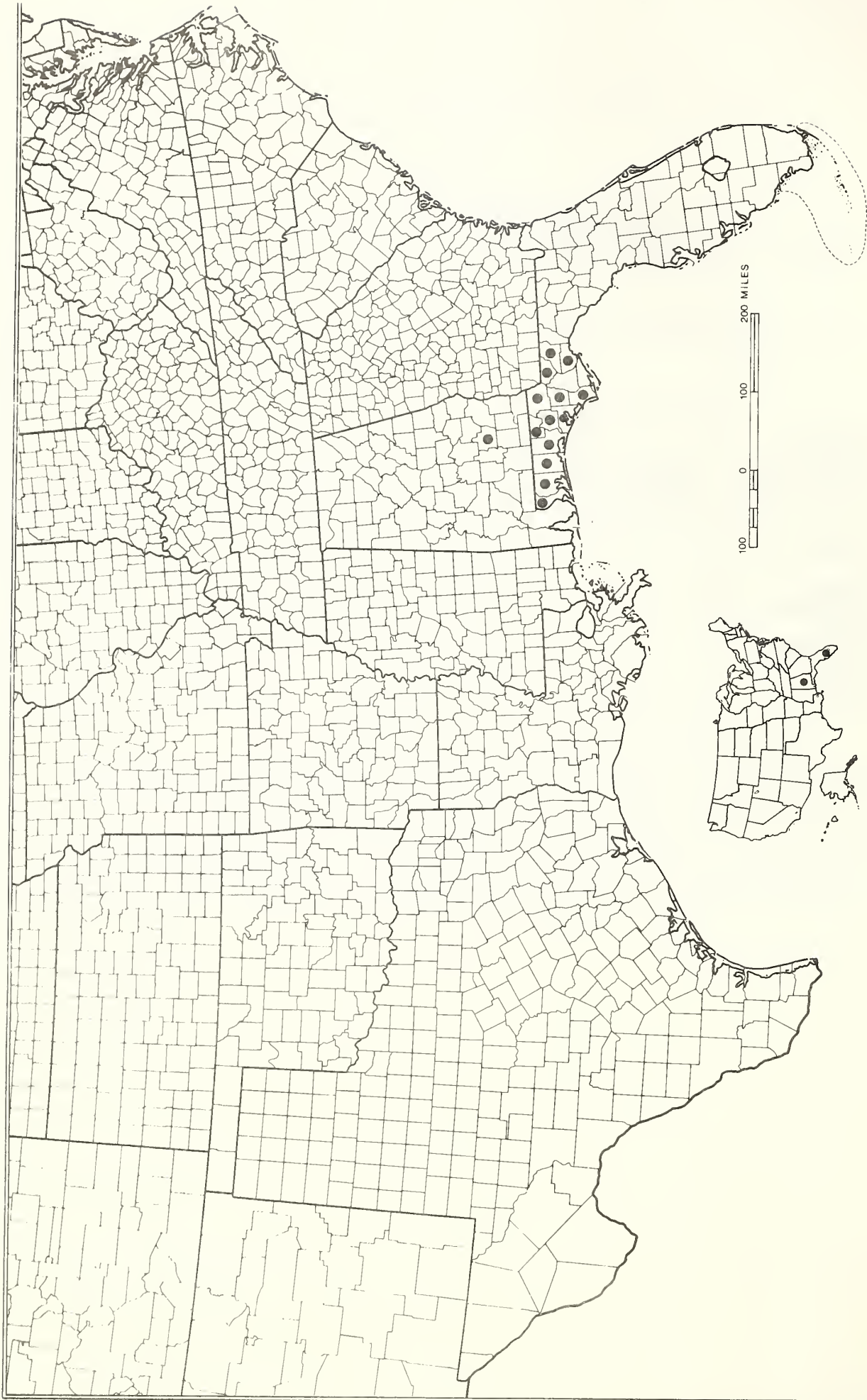
SPECIES: #48 Warea sessilifolia Nash; Sessile-leaved warea

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy							X	
Damage								
No lasting effect		?						?
Beneficial if done properly	X				X	X		

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980



MAP 48. *WAREA SESSILIFOLIA*

CARYOPHYLLACEAE

Arenaria alabamensis (McCormick, Bozeman & Spongberg) Wyatt;  
Alabama sandwort

Minuartia alabamensis McCormick, Bozeman & Spongberg

Technical Description

Strongly tufted, delicate, smooth, winter annual from shallow, fine, diffuse roots and overwintering small rosettes.

Stems.--Capillary, greenish with maroon tints, 4-8 (-10) cm high, erect, usually several from a rosette, simple or with several branches from near the base.

Leaves.--Rosette leaves spatulate, somewhat succulent, usually under 1 cm long, smooth. Stem leaves spreading, opposite, the lowest on close nodes, becoming more distant upward, largest at about mid-stem or just below inflorescence branches, linear or subulate, 2-6 mm long (usually around 3), 1-2 mm broad, bluntish-tipped, entire, the bases narrowed, clasping.

Inflorescence.--Flowers from solitary and terminal to several, each terminating elongate, upwardly arching, axillary flower stalks or long-stalked on axillary inflorescence branches, in any case the inflorescence delicate and open.

Flowers.--Sepals 5, about 1.0-2.5 mm long, ascending, narrowly ovate or oblong, obtuse, entire with broad thin borders and greenish, almost veinless, convex backs. Petals 5, short-oblong, 1-3 mm long, at summit notched or obtuse, all white. Stamens 8-10, about as long as the sepals, the distinct filaments slender, the nearly round anthers about 0.2 mm long. Carpels mostly 3, the superior, 1-loculed ovary about as long as the sepals, the stigma branches linear, 3.

Fruit.--Capsule ovoid-conic, about 3 mm long, dehiscent along three sutures. Seeds numerous, blocky, about 0.5 mm long, reddish-brown, nearly smooth.

Distribution and Flowering Season

Granitic outcrops, in the Piedmont of Alabama and North Carolina. Flowering March into May.

Special Identifying Features

This recently described species is superficially like A. uniflora (Walt.) Muhl. and A. glabra Michx. which are also plants of arenaceous or granite outcrops. However, it is an even smaller plant, more delicate than either, and in the field it is easily picked out because of its smaller flowers.

Habitat and Management Implication

A typical habitat would be small depressions or cracks in the granite where wash and wind have deposited substrate and where some water accumulates. Here it will occupy, (together with other Arenaria, Diamorpha, Lindernia, and Talinum)

considerable area and this is nearly always in full sun. The granite outcrops, where soil has had opportunity to form, support trees such as Juniperus, Pinus echinata, P. taeda, Quercus prinus, Q. coccinea, Q. velutina, Q. rubra, etc., upland hickory species, Ulmus alata, Fraxinus, Diospyros, and a variety of hardwoods typical of either the oak-pine or oak-hickory types. As such stands develop on the granite, the herbaceous, open outcrop species are shaded out by the encroaching shrubs and trees.

The greatest threat to a granite outcrop endemic such as this would be use of the granite by quarriers. Borders of the vernal pools this grows in are also trampled to mud by livestock and are likewise destroyed through careless intrusions by people, particularly "buggy" drivers and motorcyclists. The outcrops are poor sites for trees, these usually of poor form, cut mainly for wood and posts.

#### Selected Readings

McCormick, J. F., J. R. Bozeman and S. Spongberg. 1977. A taxonomic revision of granite outcrop species of Minuartia Brittonia 23 (2):149-160.

McVaugh, R. 1943. The vegetation of the granitic flat-rocks of the southeastern United States. Ecol. Monogr. 13: 119-116.

Radford, A. E., H. E. Ahels, & C. R. Bell. 1968. Manual of the vascular flora of the Carolina, 441-443.

Wyatt, R. 1977. Arenaria alabamensis: A new combination for a granite outcrop endemic from North Carolina and Alabama. Bull. Torr. Bot. Club 104(3): 243-244.

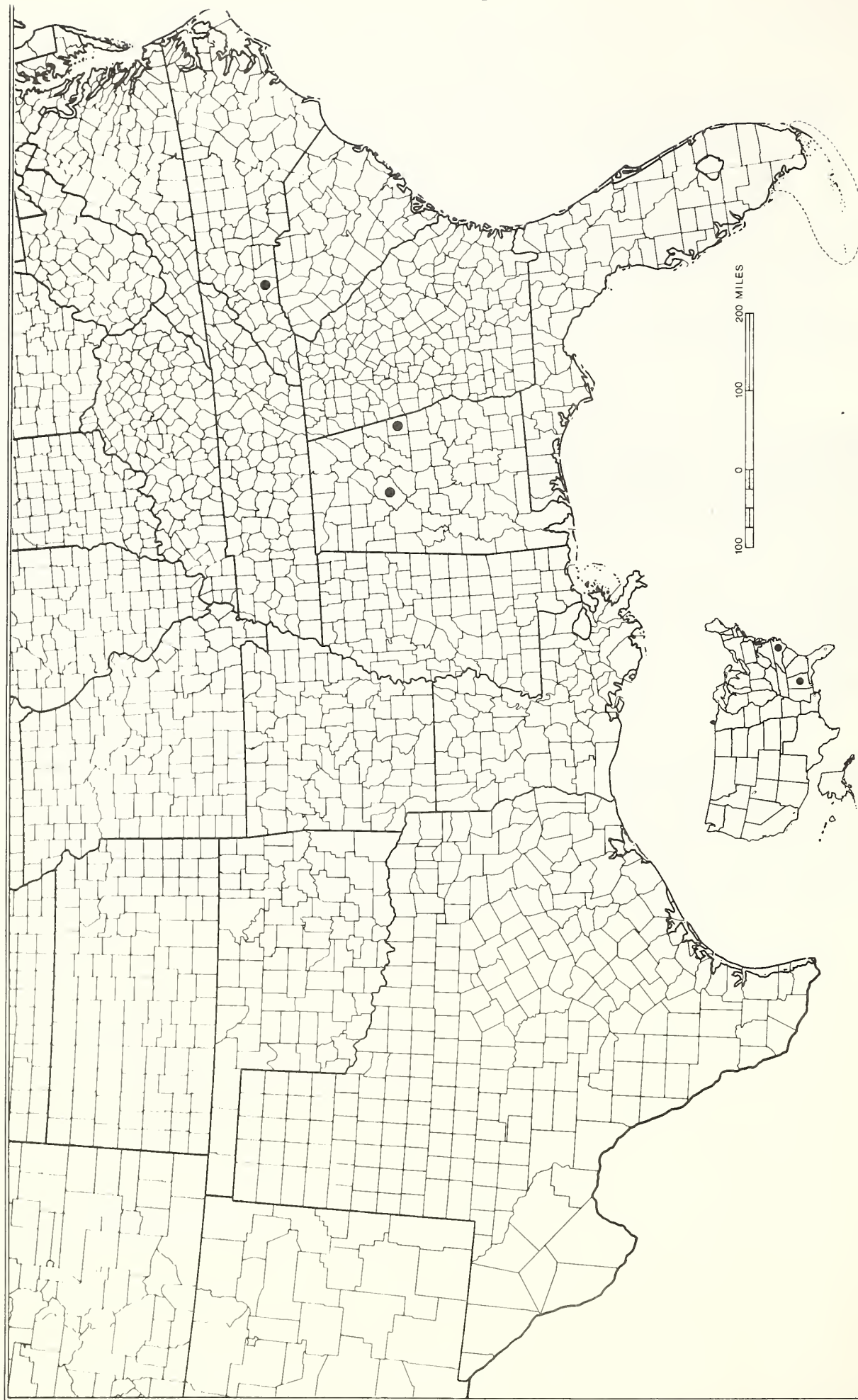
#49 Arenaria alabamensis (McCormick, Bozeman & Spongberg) Wyatt;  
 SPECIES: Alabama sandwort

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over- story	Cut over- story	Establish plantation	Graze
Destroy								
Damage								X
No lasting effect	X	NA					NA	
Beneficial if done properly					X	X		

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980



MAP 49. ARENARIA ALABAMENSIS

CRASSULACEAE

Sedum nevii A. Gray; Nevius' stonecrop

Technical Description

Succulent, smooth, low perennial from slender, creeping stoloniferous rhizomes.

Stems. --Of two sorts, sterile and fertile, the sterile produced in summer and fall from the slender, creeping rhizomes, usually not longer than 5 cm., sprawling or decumbent; fertile shoots produced in spring, usually close-set from rhizome just beyond the sterile shoots, few-to-several, decumbent, terete, pale green, to 15 cm high.

Leaves. --Sessile, spreading, the bases short-decurrent, spirally arranged, the blades of sterile shoots smallest and most distant at shoot base, close-set (thus shoot tips very leafy) and largest distally on the shoot, the lowest mostly broadly spatulate, flattened, broadly obovate, the uppermost 5-8 mm long, broadly spatulate, pale green, sometimes slightly glaucous; leaves of fertile shoots shortest toward stem base, there mostly linear, oblong, or narrowly oblanceolate or spatulate, the largest at mid-stem or above, spreading, nearly terete to somewhat flattened, linear to narrowly linear-oblanceolate, mostly 1.0-1.5 cm long, deep gray-green.

Inflorescence. --Broadly cymose, the flowers numerous, sessile along the upper side of the 2-5 spreading-recurved branches, the lineal bracts slightly shorter or slightly longer than the flowers, scattered.

Flowers. --Regular, complete. Sepals 4-5, lanceolate to oblong, linear, or narrowly spatulate, often unequal, mostly 2.5-3.5 mm long, green, blunt-tipped. Petals 4-5, lance-attenuate, ca. 5 mm long, white. Stamens about as long as the petals, usually 10, the short-oblong, cinnamon-red anthers ca. 0.5 mm long, the linear filaments white, slightly dilated at base, attached at rim of a short hypanthium. Carpels lanceolate in outline, distinct, equal in number to petals, ca. 4 mm long, angulate, pale, tapering into the style to produce a definite beak.

Fruit. --Follicular, keeping much the same shape but slightly larger than the ovaries, straight but spreading at maturity.

Distribution and Flowering Season

Moist, shaded or sunny, usually calcareous or shaley rock of bluffs and ravines, usually forming mats intermixed with mosses, western North Carolina and eastern Tennessee (Polk Co.), southward into Appalachian Alabama. Flowering in May and June.

Special Identifying Features

S. nevii has been treated variously by authors, often being considered

the same as S. glaucophyllum Clausen, but having a different chromosome number and, in general, is an even smaller plant with less glaucous foliage, smaller, narrower offshoot leaves, smaller flowers. It has been confused sometimes with perennial races of S. pulchellum Michx. as well, but again is of lower stature, with flatter flowering shoot leaves and smaller, white flowers.

#### Habitats and Management Implications

S. nevii forms small to rather extensive mats or patches, usually mingling with various mosses on or around outcrops of limestones, dolomites or calcareous shales, and under mixed hardwoods of ravines and river bluffs. Overstory species consist of a mixture of Quercus alba, Q. muhlenbergii, Q. shumardii, Q. rubra, Q. velutina, Ulmus, Tilia, Acer saccharum, A. rubrum, Fraxinus americana, etc., with a scattering of Pinus, Juniperus (this being shaded out, or occurring in small clearings). Associated with the sedum in addition to mosses are such spring flowering herbs as Dentaria, Hepatica, Ranunculus, Claytonia, Viola, Dodecatheon, Vicia, Uvularia, etc., various carices, ferns such as Cystopteris, Woodsia, Asplenium, Pellaea, Cheilanthes, and a variety of grasses including Melica, Poa, Bromus (purgans), Panicum (particularly P. commutatum, P. dichotomum, P. laxiflorum), Chasmanthium, Muhlenbergia. In that the Sedum is on a thin soil mantle on or around outcrops and boulders, it is evident that heavy logging of the overstory would have an adverse effect either through admission of too much light, thus drying out the habitat, or through the erosion stimulated by the mechanics of timbering these steep areas.

#### References

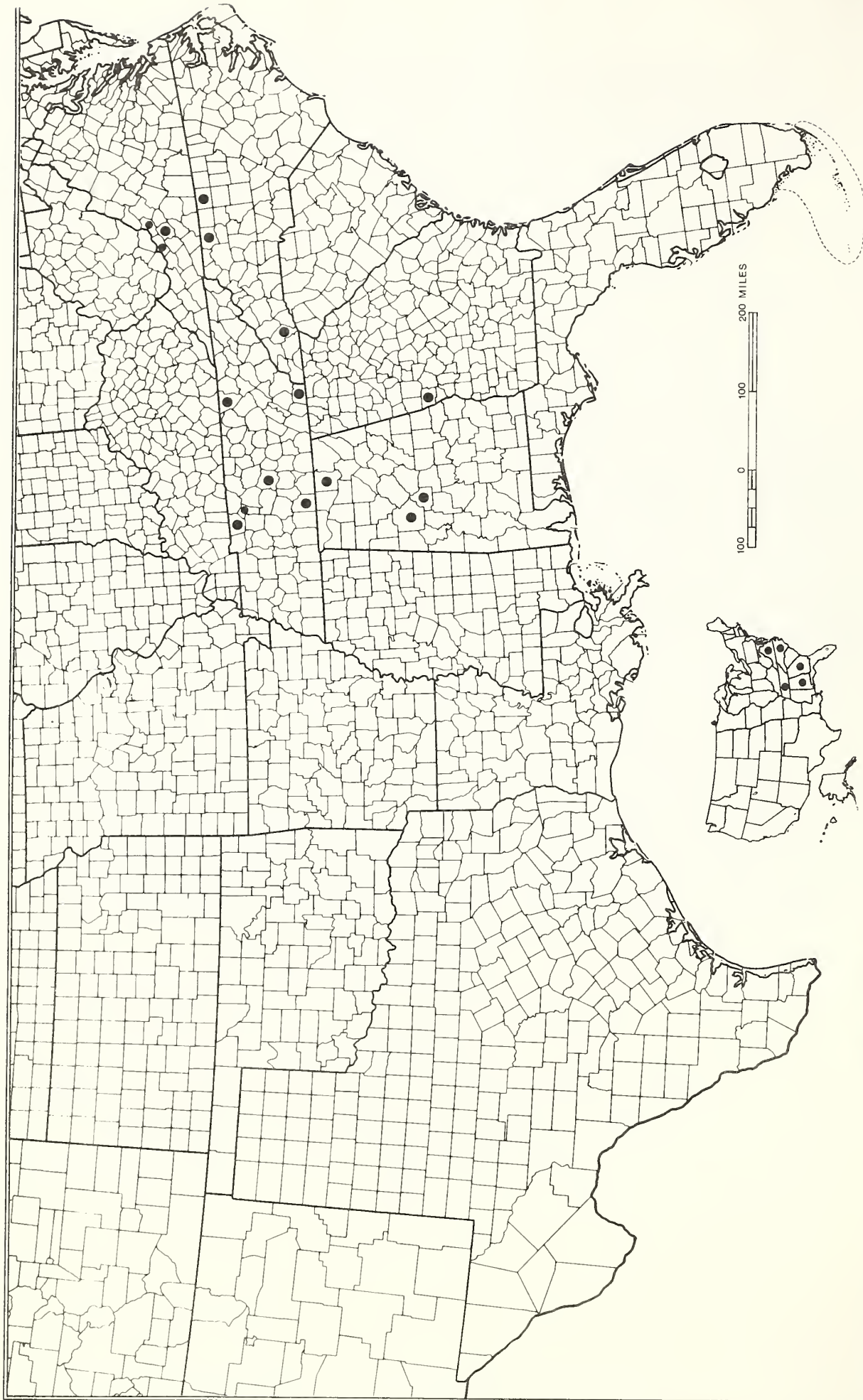
- Baldwin, J.T. 1944. Affinities of Sedum nevii. *Rhodora* 46: 451-452.
- Clausen, R.T. and C.H. Uhl. 1943. Revision of Sedum cockerellii and related species. *Brittonia* 5 (1): 33-46.
- \_\_\_\_\_. 1975. Sedum of North America north of the Mexican Plateau. Cornell Univ. Press
- Gray, A. 1858. Neviusia, a new genus of Rosaceae. *Am. Acad. Arts and Sci. New Ser.* 6: 373-376.
- Radford, A., H.E. Ahles & C.R. Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 513-516. Chapel Hill.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 586-588.

SPECIES: #50 Sedum nevii A. Gray; Nevius' stonecrop

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy	X							
Damage								
No lasting effect		NA	NA	NA	X			
Beneficial if done properly								

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—



MAP 50. *SEDUM NEVII*

CYCADACEAE

Zamia integrifolia Ait.; Florida coontie

Z. floridana DC.

Palmifolium integrifolium O. Ktze.

Technical Description

The plants fernlike.

Stems.--The short crown developing from a tuberous-thickened, usually erect underground stem the size and shape of a large sweetpotato which, toward its pointed base, puts out thickish roots and, at its apex, the wooly crown, most of which is covered by old, flattened, wooly and hairy leaf bases, together with narrowly triangular scales.

Leaves.--Foliage leaves are uncoiling as are those of ferns, mostly 5-8 dm long, evergreen, the brownish rachis ascending, hairy toward its base, stiffish, the inside flattish or concave, the lower side convex, sometimes angled, the blade pinnate, occupying a half or more the total length, of many pairs of leathery leaflets, these arranged to form a broad or narrow "V"; leaflets linear, mostly 7-10 (-14) cm long, evenly parallel-veined (the veins are most evident on lower surfaces), obtuse, the margins revolute and entire, the surfaces smooth, the upper a dark, lustrous yellow-green, the lower somewhat paler.

Cones.--Male and female cones produced on separate plants, from the center of the crown, erect on stout, fuzzy-hairy stalks. Male cone in "bloom" cylindrical or lance-ovoid, 5-8 cm long, the cone-scales (sporophylls) attached peltately (like thumbtacks) in vertical, close-fitting rows much as are kernels of corn on the cob, the exposed outer surfaces of the scales hexagonal, cinnamon-brown, minutely fuzzy, each bearing beneath, along the scale axis, several yellowish sporangia. Female cones larger, stouter, on stouter stalks, mostly short-cylindrical, the scales much like the male in structure and pubescence, but bearing fewer and larger sporangia (ovules). Male cones not persisting long after pollen shed. Female cones persisting, expanding as the enlarging, orangish, fleshy coated ovules ripen and push the cone scales apart. Mature seed with outer coat fleshy, orange-red, mostly between 1.5 and 2.0 cm long, the tips rounded, the seed body somewhat prismatic.

Distribution and Flowering Season

Dry, sandy pinelands, pine-palmetto flatwoods, sand ridges, hammocks and kitchenmiddens (oystermounds), from the keys northward through the peninsula into northwestern Florida along the Suwannee. Cones may be produced all year, but heaviest in late winter and early spring.

Special Identifying Features

The taxonomy of these species is somewhat confused. Small (1933) treated three species in addition to Z. integrifolia. Z. angustifolia Jacq. is considered by some a synonym of Z. integrifolia. Long and Lakela treat the other two (Z. silvicola Small, Z. umbrosa Small) as Z. pumila L. Most of the characters

used to distinguish species have to do with the leaves. In Z. pumila, the leaflets have lower length-width ratios, more veins, and the plants are on the average lower.

#### Habitats and Management Implication

The original distribution of Z. integrifolia is difficult to determine. The underground, potato-like stem is filled with starch, and the Indians extracted this as a flour for their bread. It is believed, therefore, that the Seminoles and their predecessors carried the plants about with them. This idea is reinforced by the abundance of Zamia on and around kitchenmiddens and old Indian campsites and settlement locations.

Zamia plants are usually rooted in moist, well drained, sandy loam or sands, these areas either in rather dense, low, hardwood-cabbage palm hammocks over limestone, in high, hardwood hammocks (again, over limestone or amidst outcrops of it), on sand ridges forested with longleaf pine-deciduous hardwood, sand ridges with sand pine-evergreen scrub, or even in expanses of slash pine-saw palmetto flatwoods. Their thick, underground stems make them fairly resistant even to hot fires. In that they thrive with or without shade, various logging practices have little effect on them, providing this is not followed by whole-sale site preparation involving drastic soil disturbance which exposes or chops up the underground parts.

The greatest threat now posed against "Conti Hateka" is a combination of whole-sale site preparation by pine monoculturists, similar preparation for large housing and recreational developments, or large-scale digging up of the plants by nursery people.

#### Suggested Reading

Long, R. W. and O. Lakela. 1971. A flora of tropical Florida, pp. 108-111.

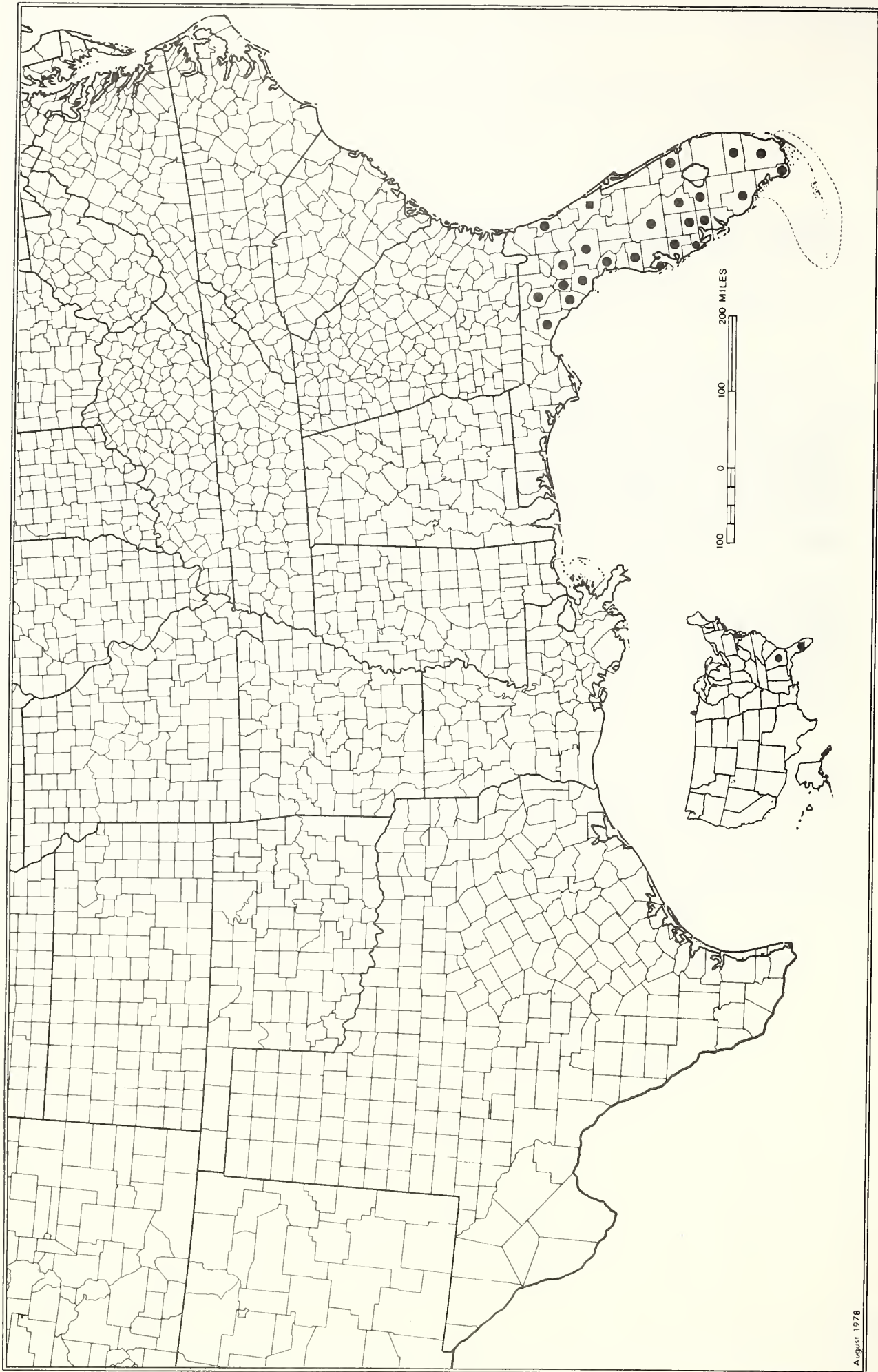
Small, J. K. 1933. Manual of the southeastern flora, pp. 1-2.

SPECIES: #52 Zamia integrifolia Ait.; Florida coontie

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		X		X				
Damage			X			X		
No lasting effect								
Beneficial if done properly	X				X			

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—



MAP. 52. *ZAMIA INTEGRIFOLIA*

EUPHORBIACEAE

Croton alabamensis E. A. Smith; Alabama croton

Technical Description

Broad-crowned shrub 2-3 m tall with overwintering leaves.

Stems.--Bark of older wood thin, gray-brown, cracking irregularly, the main stem with an irregularly forking branch habit (usually branching at base of old inflorescences), the branches slender but stiffish, spreading, leafy only toward their tips. New shoot growth whitened by a dense coat of thin, silvery scales, terete.

Leaves.--Spirally arranged, spreading on slender, stiff, densely silvery-scaley petioles 0.5-2.0 cm long, the blades narrowly ovate, elliptic or oblong, 5-10 cm long; the tips rounded-emarginate, the margins entire, the bases acute, the upper surface dark yellow-green, smooth or sometimes with a scattering of pale scales, impressed-pinnate-veiny, the lower surface densely silvery-scaley, with main veins strongly raised.

Inflorescence.--Flowers unisexual on the same plant, in terminal racemes of one sex or with male above female, the racemes erect, slender but stiffish, silvery-scaley, mostly 5 cm long or less, the flower stalks spreading or ascending, in flower mostly 5 mm or less long, somewhat lengthening with age.

Flowers.--Symmetrical: male flowers broadly cupshaped or rotate, ca. 5 mm across; calyx lobes 5, spreading-ascending, narrowly triangular, 2.5-3.0 mm long, greenish with silvery scales; petals oblong, pale green, about 2.5 mm long, ciliate, the backs scaley; stamens 10-25, arising from the inside of a low, lobed, orangish, pilose disc, spreading or ascending on slender, hairy-based filaments to 4 mm long, the anthers about 1 mm long, the two sacs convergent. Female flowers campanulate, about 4 mm high, the petals and sepals of similar shape to the male, but more erect, the superior, ovoid, scaley ovary ringed at base with an orangish, lobed disc and tipped by 3 style branches, these troughed internally toward the summit.

Fruit.--Capsules erect on ascending pedicels, these lengthening to between 1.5 and 2.0 cm, capsule body subglobose, strongly 3-lobed, pale green with a coating of silvery scales. Seeds 1/locule broadly ovoid, ca. 7 mm long, the backs rounded, the inner 2 faces converging in a broad angle, the surfaces reddish-brown with irregular streaks and mottlings of white.

Distribution and Flowering Season

Calcareous rocky bluffs, rocky, wooded, ravine slopes and terraces, Cahaba and Warrior River systems of middle Alabama near contact of Appalachian and Coastal Plain provinces. Flowering mostly from February into April.

Special Identifying Features

The only Croton in the southeastern United States combining a shrubby habit with a complete perianth.

## Habitats and Management Implication

The authentically known populations of this species are in but two counties of Alabama. The individual populations consist of from but a few plants to very many covering several acres. The shrubs are usually either on hard limestones or dolomitic limestones or calcareous shales and may be found either in full sun or as understory to oak-hickory-ash-hard maple-juniper. The soils are thin, heavy, probably basic in reaction. The geology of this same area is complex, the sedimentary rocks striking the drainages along which the Croton grows ranging from basic to quite acidic, so that a wide variety of forest types are found nearby, including some fine sites for both mixed hardwoods and pine. The steep topography would favor some caution in logging; the soil also is too rocky for most methods of site preparation. The thin-barked and shallow-rooted character of the Croton shrubs would be an indication that they would not survive fire of any intensity. No records are available of its being used by livestock; indeed many Croton are considered toxic to livestock.

## Selected Readings

- Harper, Roland. 1928. Economic botany of Alabama, catalogue of the trees, shrubs and vines, etc. Geologic Survey of Alabama, Monograph 9 (2): 229.
- Mohr, Charles. 1889. New or little known shrubs of eastern North America. Garden and Forest 2:592.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 780-783.

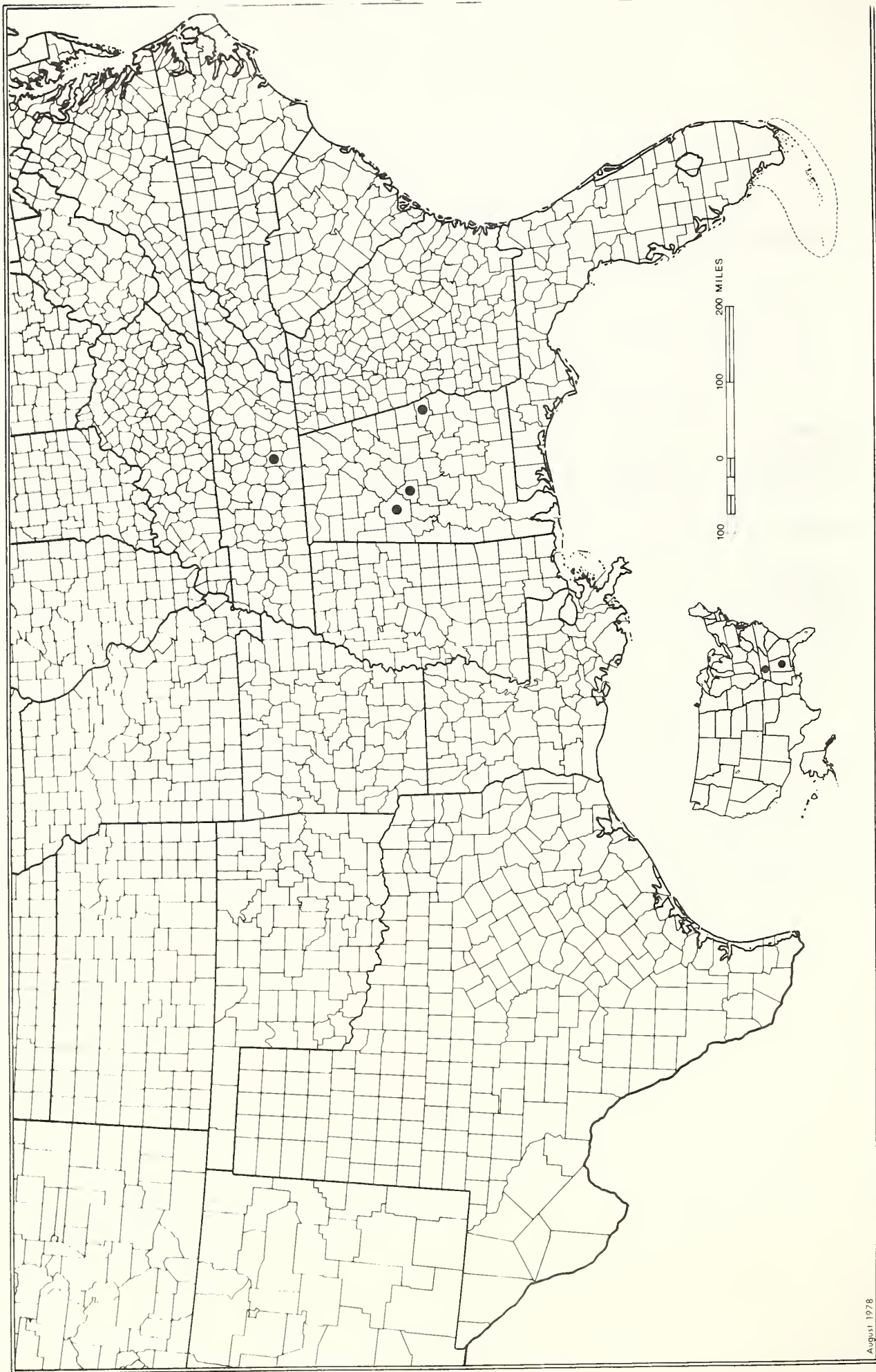
SPECIES: #53 Croton alabamensis E. A. Smith; Alabama croton

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy								
Damage								
No lasting effect	NA					NA	NA	X
Beneficial if done properly					X			

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980



MAP 53. CROTON ALABAMENSIS

FABACEAE

Baptisia arachnifera Duncan; Hairy wild-indigo

Technical Description

Perennial, all parts densely cobwebby-white-tomentose, from short, stout rootstock.

Stems: Erect, to 1 meter tall, branching prolifically from near the base to form leafy crowns broader than high. All branches round in cross section, zig-zag, reddish-brown but appearing gray because of heavy tomentum.

Leaves: Numerous, alternate, lacking stipules, broadly ovate or nearly round, the larger ones 5-8 cm. long, leathery, gray-green, the apex rounded, obtuse-angled, rarely emarginate, the margins entire, the bases nearly sessile, rounded or cordate. Leaves gradually reduced in size upward on the branches grading into roundish or lanceolate small bracts.

Inflorescence: Flowers numerous in slender, stiffish elongate racemes at branch tips, from close-set to somewhat scattered, particularly toward the raceme base as fruit develops. Flower stalks ascending or erect, tomentose, to 3 mm. long.

Flowers: Calyx 6-7 mm. long, gray-tomentose, broadly and obliquely bell-shaped, the 5 narrowly triangular lobes somewhat unequal, slightly longer than the calyx tube. Corolla yellow, 11-12 mm. long, the standard petal somewhat shorter than the wings and keel. Stamens 10, all separate.

Fruit: Densely pale-cobwebby-tomentose, on a stalk 3-4 mm. long, the body nearly round, 8-10 mm. long, strongly margined along the valve edges, tapering abruptly into a slender-tipped beak nearly as long as the body.

Distribution and Flowering Season

Sandy slash or longleaf pine-saw palmetto-galberry flats or low sandy rises therein, southeastern Georgia. Flowering late June into July.

Special Identifying Features

This species is perhaps the most distinctive in the genus, its bright yellow flowers and the silvery sheen of its cobwebby hairy foliage bringing it into sharp contrast in the pinelands. It is the only sessile and simple-leaved, estipulate southeastern Baptisia which has such a quality and quantity of pubescence.

Habitats and Management Implication

B. arachnifera has a small range, being known from only Brantley and Wayne counties. There it may be abundant locally on sandy roadsides, old fields, or rather open pine flatwoods and plantations. It is another fire controlled species, being most abundant in pine-saw palmetto-galberry where there is evidence of recent fire. From such areas it will seed into sites prepared

for pine, and is not infrequent in plantations where stems are of pulpwood size or larger. However, as pine plantations age to where growth of pine is dense, it and nearly every other associated herb, disappears.

#### Reference

Duncan, W. H. 1944. A new species of Baptisia. Rhodora 46 (542); 29-31.

Revised March 1980

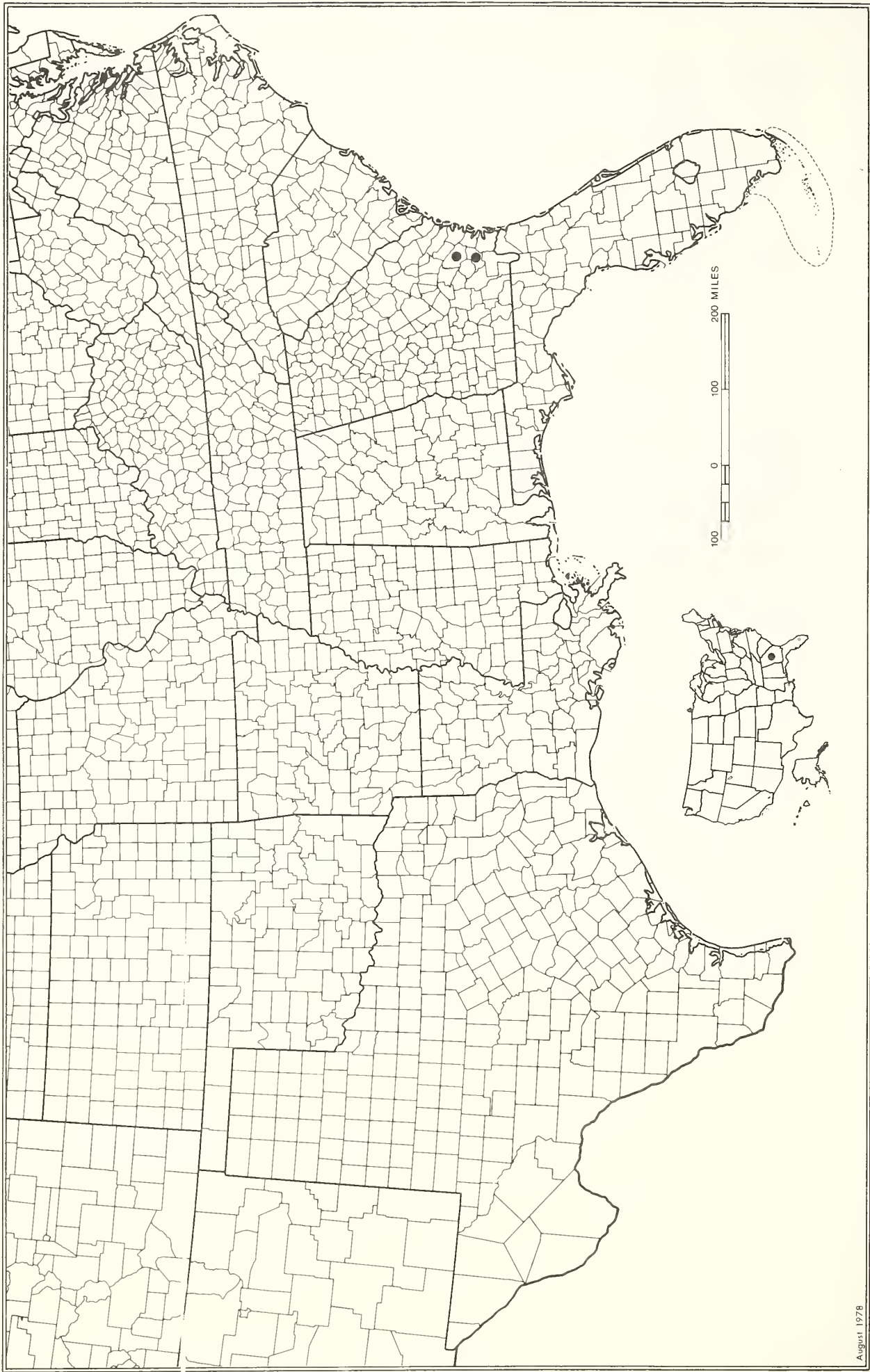
SPECIES: #55 Baptisia arachnifera Duncan; Hairy wild-indigo

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X				
Damage			X					
No Lasting Effect							X	X
Beneficial if Done Properly	X				X	X		

Other Comments: With a balance of age classes and freshly site prepared areas, this species should always be present.

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



August 1978

MAP 55. BAPTISIA ARACHNIFERA

FABACEAE

Vicia ocalensis Godfrey & Kral; Ocala vetch

Technical Description

Perennial both sprawling and climbing by tendrils, forming extensive mats of growth.

Stems: The lax stems pale green (save toward the brownish bases), frequently branched, striate-angulate, scattered pilose.

Leaves: Alternate, rather distant, spreading, pinnately compound, the petiole much shorter than the leaflet-bearing part, it and the rachis striate, grooved along upper surface, scattered pilose; stipules lanceolate-curved, strongly few-veined, pilose, about 3 mm. long; leaflets mostly 3 pairs plus the forked tendril pair, linear or narrowly oblong-linear or linear-elliptic, mostly 3-5 cm. long, 3-6 mm. broad, apically rounded and mucronate, marginally entire, slightly narrowed, then abruptly joining the short (about 1 mm.) pilose stalk, the upper surfaces pale glaucous green, the lower surfaces slightly paler and raised-arcuate-pinnate veined, both surfaces nearly smooth or with scattered hairs particularly toward margins.

Inflorescence: Flowers in axillary, upward-arching racemes, these somewhat longer than the subtending leaf, the stalks striate-angulate, sparingly pilose, the racemes at first compact, later elongating. Flower stalks short, spreading 1-2 mm. long, pilose, the flowers tending to be unilateral, somewhat reflexed.

Flowers: Calyx campanulate, about 3 mm. high, irregular, with the base somewhat pouched on upper side and the apex oblique, the teeth shorter than the tube, triangular, the lower 3 longer, more acuminate than the low-triangular upper 2, the surface pale yellow green, pilose. Corolla about 1 cm. long, irregular with the banner petal largest, pale blue or near white basally, the broader and upswept blade deeper but still pale blue, apically notched. Wing and keel petals shorter, narrower, projecting forward, the keel petals arching upward toward the tips at their lower margins, all white save for blue tips of the keel. Stamens 10, all united to near filament tips. Ovary superior, pubescent, the style bent upward, pubescent just below the stigma.

Fruit: Legume 4.0-4.5 cm. long, 6-8 mm. broad, strongly flattened, oblong-linear with apex and base oblique, the short style persistent as an upcurved beak. Seeds 8-12, rounded and compressed, dark brown, smooth, 2.0-2.5 mm. broad.

Distribution and Flowering Season

Small, marshy clearings along Juniper Creek, Ocala National Forest, Marion County, in northern peninsular Florida. Flowering March into May.

## Special Identifying Features

The species is nearest two other vetches, namely V. acutifolia and V. floridana, and is nested well within the ranges of both. However V. ocalensis has longer stems than either, longer leaflets than either, more (12-18) and longer flowers than both, broader and longer legumes and wider seeds than both.

## Habitats and Management Implication

This rare species, now eliminated from the site it was first observed through "improvement" for swimmers and fishermen, is known only from scattered localities along one stream which originates as a boiling spring. The substrate is a wet, sunlit, sandy peat. Associate species are mostly grasses (Andropogon, Spartina) and sedges (Dichromena, Rhynchospora, Cladium, Carex, Cyperus) of species normally found along edges of brackish marsh. The stream flows through and over limestones and sands derived therefrom, and is bordered by a fringe of low hammock (Sabal palmetto, Persea, Gordonia, Quercus virginiana, Acer rubrum, Osmanthus, Myrica, Lyonia, Vaccinium, Smilax, Ilicium, etc.) this bounded by higher, drier sites in which the dominants are Sand Pine and various evergreen scrub species. Most of the management of forest in this area involves clear cutting of the predominant Sand Pine, together with wholesale mechanical site preparation of the sandy soils, this generally leaving the lower, low-hammock, species undisturbed. The main threat to Vicia ocalensis would be posed through logging and site preparational disturbance extending too close to the stream and sandy wash down into it from such activity; or through disturbance along the banks by either swimmers, fishermen, or personnel "improving" the banks so as to provide access for boats and people (this is what has destroyed the plants in the type locality). There has been no recent fire or grazing activity in the small area of this species, so that there has been no opportunity to observe this sort of impact.

## References:

Godfrey, R. K. and R. Kral 1958. A new species of Vicia (Leguminosae) in Florida. Rhodora 60 (717): 256-258.

Revised March 1980

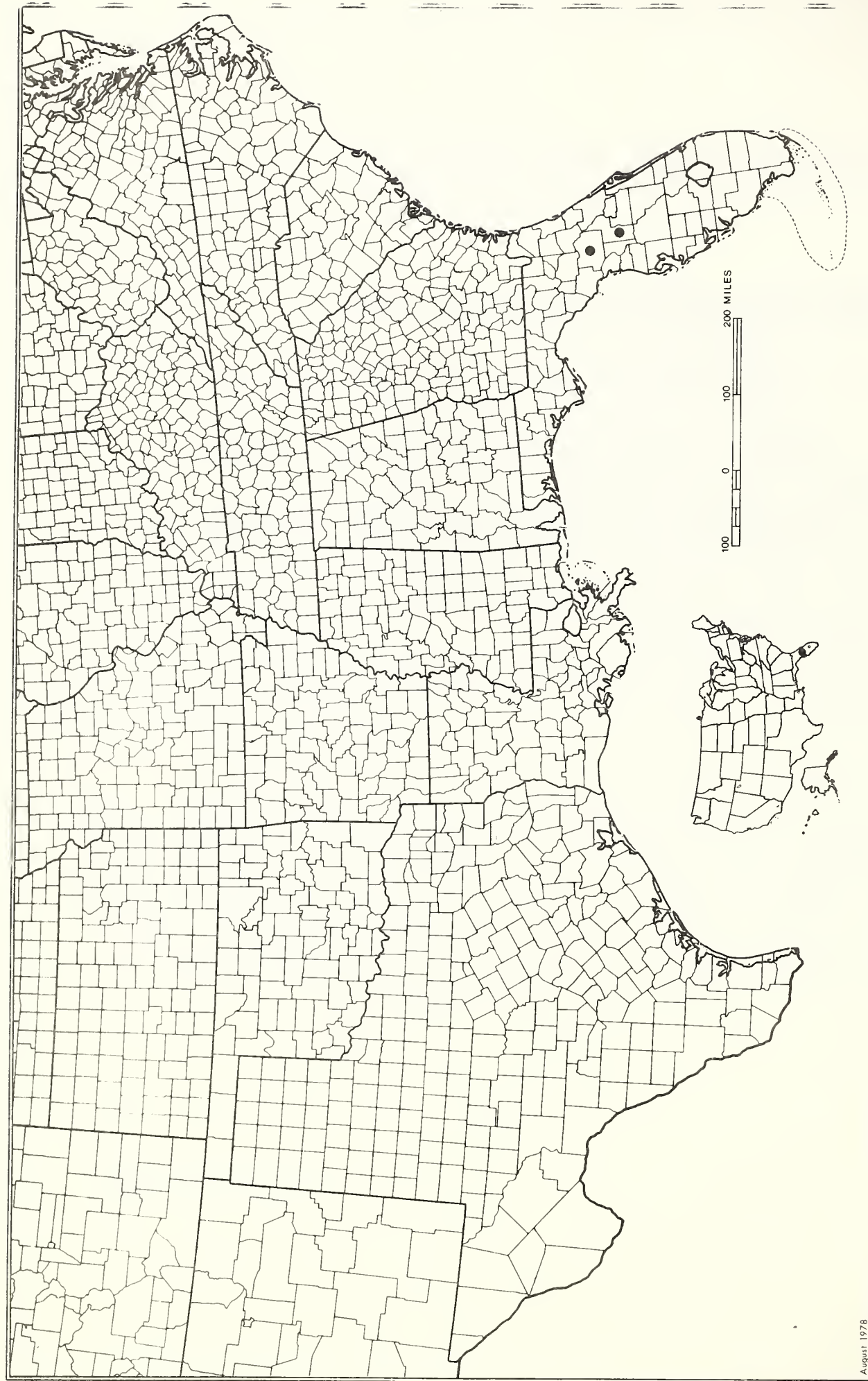
SPECIES: #57 Vicia ocalensis Godfrey & Kral; Ocala vetch

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy	X	X	X	X			X	
Damage								
No Lasting Effect								?
Beneficial if Done Properly					X	X		

Other Comments: Exclude streambank disturbance to protect the plant.

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 57. *VICIA OCALENSIS*

FAGACEAE

Castanea ozarkensis W. W. Ashe; Ozark chinquapin

C. arkansana, Ashe

C. ozarkensis var. arkansana (Ashe) Ashe

Technical Description

A tree at times reaching 20 m, now usually much lower and often shrubby.

Stems.--The trunk sometimes short, quickly branching (when in forest) with a straight, clear pole, the bark gray brown on older trees of rather long, flat (but scaly), thickish ridges separated by rather broad fissures, the crown full and roundish. First-year twigs somewhat zig-zag, smooth, slender, but stiffish, terete, the bark reddish-brown or grayish with pale, small raised lenticels, the winter buds ovoid, ca. 4 mm long, mostly with 2-3 visible bud-scales, the outer dark brown, smooth, the inner with some pale appressed pubescence.

Leaves.--Deciduous, alternate, subtended by early deciduous, narrowly linear-triangular stipules, the petioles ascending, smoothish, 1 cm long or less, the blades mostly narrowly obovate, oblong or elliptic, mostly 10-20 cm long, firm, short to long-acuminate, saliently or ascending toothed, the teeth usually slender-acuminate and ascending, the base rounded or broadly attenuate, the upper surface dark lustrous green, smooth, the lower surface matted with close, yellowish, stellate tomentum and strongly pinnately veined, each vein extending straight to a tooth-tip.

Inflorescence.--Flowers unisexual, small, both sexes in the same catkin, with female below, or some catkins exclusively male, the catkins elongate, soft, evil-smelling, linear, 10-20 cm long, not 1 cm broad. Male flowers in close or interrupted clusters along the tomentose catkin axis and in axils of ovate, hairy scales.

Flowers.--Calyx 6-parted, small; stamens 10-20, with filaments very slender and anthers versatile, nearly round. Female flowers sessile toward base of some catkins, singly or in 2's or 3's, each ovoid, with a pubescent involucre of closely overlapping scales, the 6 stout-linear, smoothish-style branches projecting beyond.

Fruit.--Involucre expanding to form a roundish tomentose bur, this with branched-spiny projections, the spine branches smooth and sharp at the tips, pubescent below, the whole bur fully 3 cm across, the thickish valves 2-4, splitting to reveal a single, dull brown, ovoid nut nearly 2 cm long.

Distribution and Flowering Season

Dryish uplands and ravine slopes, in the Interior Highlands of Missouri and Arkansas. Flowering mostly in June.

Habitat and Management Implications

This species is somewhat the ecological equivalent of C. dentata, being a tree

of uplands, usually developing on acidic, sandy soils. In the overstory, its associates are upland oaks (Quercus velutina, Q. stellata, Q. marilandica, Q. coccinea, Q. prinus [montana], Q. alba), upland hickory (Carya tomentosa, C. texana, C. ovata), Ulmus alata, Nyssa sylvatica. In the understory are Cornus florida, various Vaccinium.

While the greatest impact of the chestnut blight (Endothia parasitica) has been on C. dentata, once an important timber tree, it has been but slightly less severe on the other Castanea, so that these also are being destroyed. Large specimens of any Castanea, including C. ozarkensis are becoming a rarity. Increasingly, often the only specimens obtainable are from the stump sprouts from diseased trees.

#### Suggested Reading

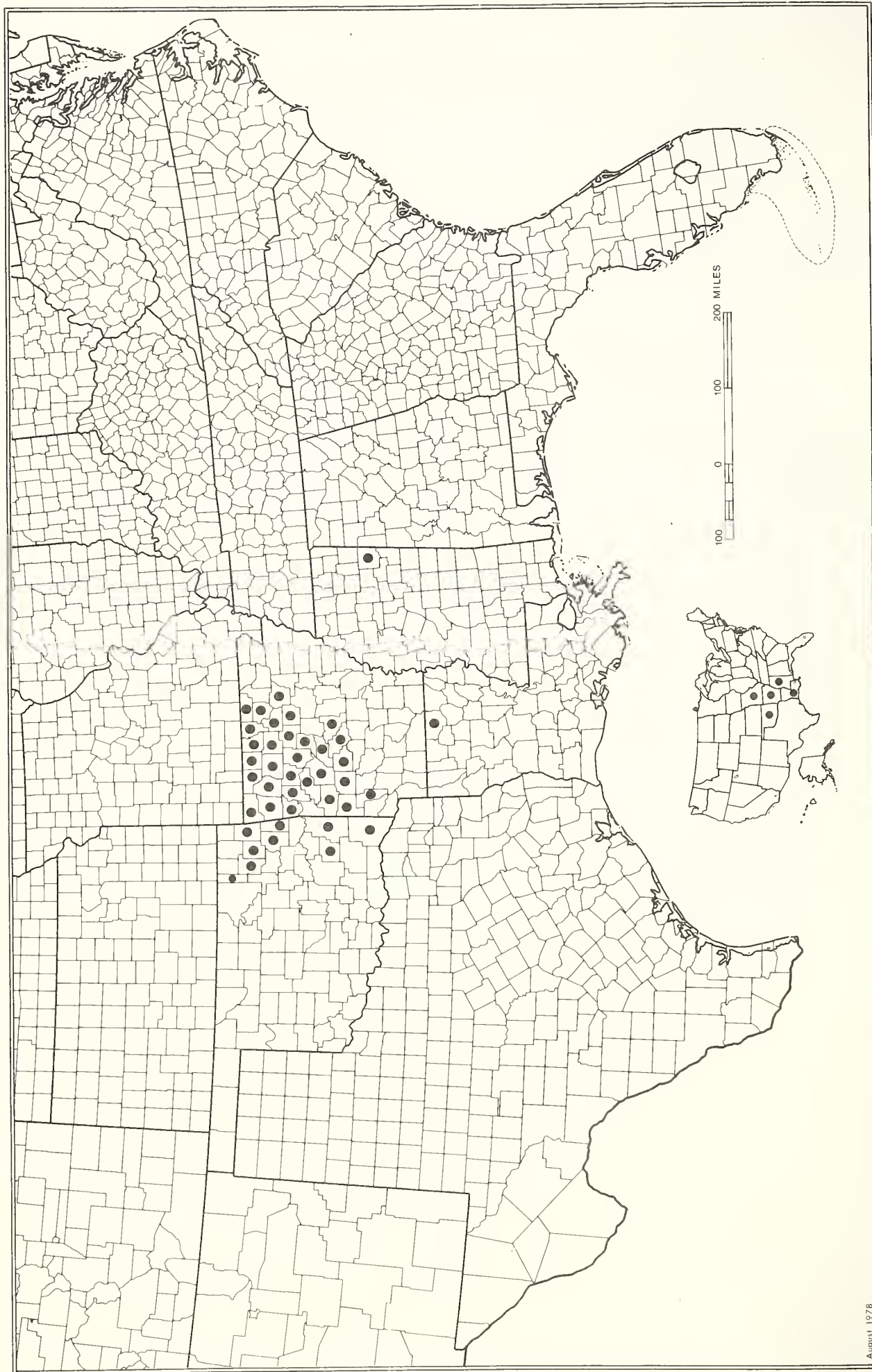
- Ashe, W. W. 1923. Notes on trees and shrubs. Bull. Torr. Bot. Club 50:360-361.  
Steyermark, Julian A. 1963. Flora of Missouri, pp. 530-531.

SPECIES: #58 Castanea ozarkensis W. W. Ashe; Ozark chinquapin

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		X	X	X				
Damage	X							
No lasting effect								
Beneficial if done properly					X	X		

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—



MAP 58. *CASTANEA OZARKENSIS*

GENTIANACEAE

Gentiana pennelliana Fern.; Wiregrass gentian

Dasystephana tenuifolia (Raf.) Pennell

Technical Description

Perennial, glabrous, the short caudex (underground erect rhizome) with a cluster of elongate-spindleform fleshy roots.

Stems: 1-few, mostly 1-3 dm. tall, erect or leaning, slender and brittle, mostly 2 mm. or slightly less thick, tapering into the rootstock, there pale, above greenish or tinted with maroon, with narrow, winged ridges, all flowering or with some shoots strictly leafy.

Leaves: Opposite, approximate to well separate, the lowest reduced and scale-like, those at midstem or above usually largest and longest, mostly 2-3 cm. long, linear or elliptic linear, narrowly acute or acuminate, entire, narrowing but slightly to clasping bases, somewhat fleshy, but flat, both surfaces green.

Inflorescence: Flowers pedicellate, either solitary at tips of simple stems or 2 because of an apical stem fork, in any event terminal, 5-6 cm. high, the pleated buds opening only in sunlight.

Flowers: Calyx 2.5-3.0 cm. long, the narrowly campanulate tube shorter than the 5 unequal lobes, these linear, similar to leaves, slightly spreading, acute, green or with tints of maroon. Petals expanding from a tubular base to a funnelform throat, thence to 5 ovate, spreading lobes 1.5-2.0 cm. long alternating with jagged-based sinuses; interior surfaces white, externally greenish-purple at upper corolla tube, darker along lateral veins with lobes tinted with greenish-blue or purple, white toward inner edges (in relation to position in bud). Stamens 5, the white, basally expanded filaments arising toward apex of corolla tube, 7-12 mm. long, the anthers triangular (anther sacs separate at base).

Fruit: A capsule ca. 1.5 cm. long, the small seeds winged.

Distribution and Flowering Season

Sandy peat of moist to wet pineland savannas or pineland clearings, northwestern Florida. Flowering October into March.

Special Identifying Features

This species is closest to G. autumnalis (G. porphirio), a species of similar habitats in the Atlantic Coastal Plain from New Jersey and Delaware southward into South Carolina, but which has blue flowers and longer stamens.

Habitats and Management Implication

G. pennelliana is found on black, humus or peat-enriched, constantly moist sands together with a wealth of grass and sedge species and a variety of savanna forbs. The overstory savanna species are mainly Slash Pine, Longleaf Pine, Pond

Pine, occasional Pond Cypress, Nyssa biflora, Myrtle, Red Bay, Virginia Bay, Cyrilla, Cliftonia. It is usually in the grass-sedge zone bordering Hypericum ponds or Titi on the wet side, Longleaf Pine-Saw Palmetto-Wiregrass on the dry side. Its thickened roots allow it to survive fire, the factor which historically has maintained the clearings this species of sunlight requires.

G. penelliana is never abundant, therefore most methods of wholesale site preparation involving mechanical disturbance of the soil will eliminate it. Site preparation involving only controlled burning will probably favor it, providing the area is not drained. Should G. pennelliana survive any mechanical site preparatory method, that method would be bedding, but the shade of a well-stocked plantation of pine would soon destroy the gentian.

#### References

Pringle, J. S. 1967. Taxonomy of Gentiana, sect. Pneumonanthae, in eastern North America. Brittonia 19 (1): 1-32.

Small, J. K. 1933. Manual of the southeastern flora, pp. 1052-1054.

Revised March 1980

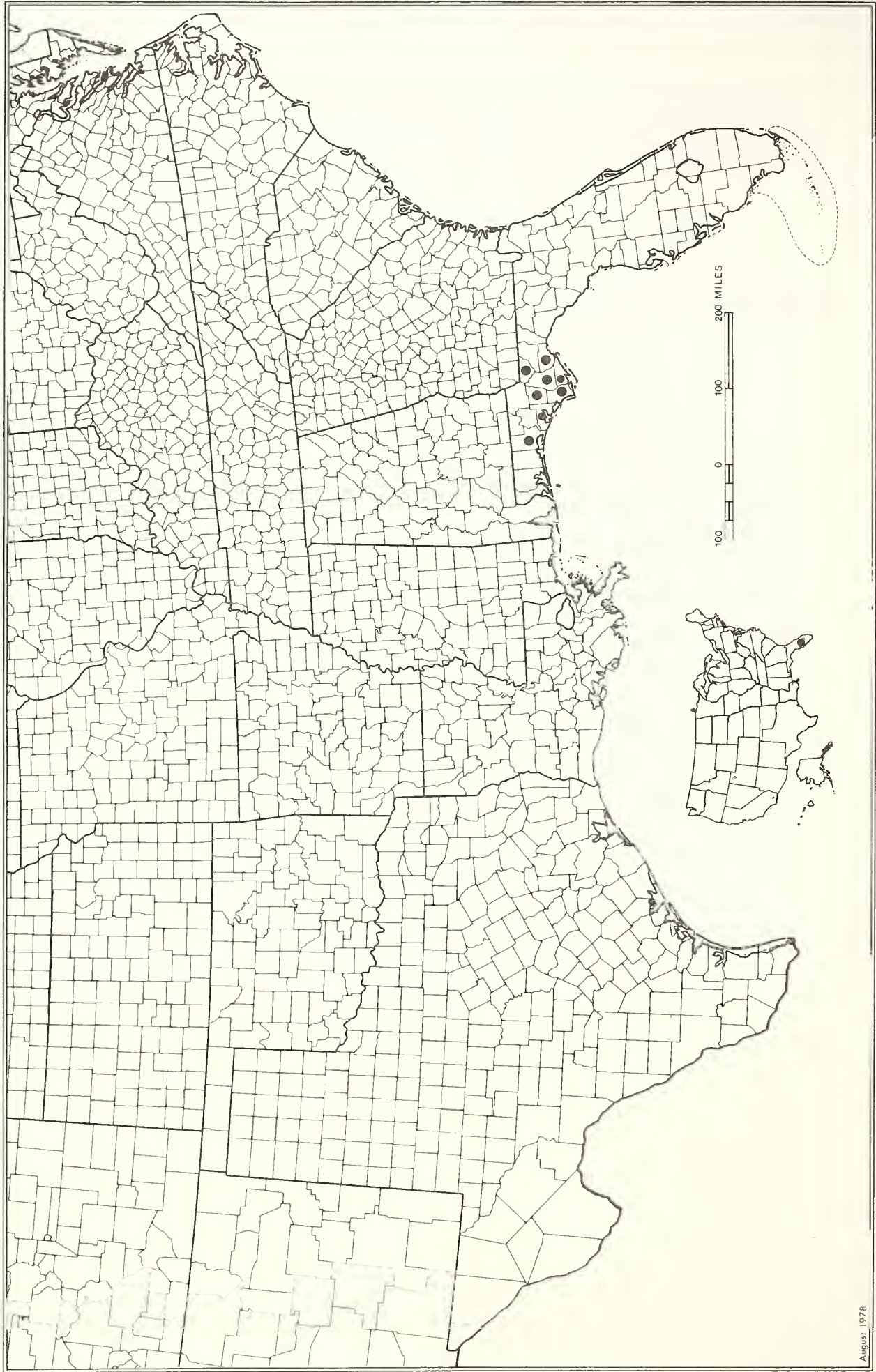
SPECIES: #59 Gentiana pennelliana Fern.; Wiregrass gentian

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								?
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 59. GENTIANA PENNELLIANA

LAMIACEAE

Conradina brevifolia Shinnery; Short-leaved rosemary

Technical Description

Profusely branched mint-smelling shrub to about 1 meter tall from a diffuse woody root system.

Stems: The bark of older wood gray, thin, peeling in slender short strips. Branchlets numerous, grayish-brown, quadrangular, the angles raised but rounded, the new surfaces canescent (minutely densely puberulent) with pale erect hairs, and toward their tips densely leafy, thus the shrub crowns dense.

Leaves: Opposite, on close-set internodes, spreading, linear, mostly 4-8 mm. long, pale green, fleshy, nearly terete, the backs coarsely glandular and canescent, the lower surface medially grooved with a single strongly raised midnerve, canescent.

Inflorescence: Flowers arising (1-6) from leaf axils of all or most all upper nodes on spreading-ascending slender, greenish-brown, minutely glandular-hairy pedicels 2-4 mm. long, each with a basal pair of linear-spatulate bract-eoles ca. 2 mm. long.

Flowers: Calyx tubular, ca. 6 mm. long, the tube 3.5 mm. long to the sinus of the tips, many-ribbed, canescent and gland-dotted, bearing at its apex internally a strong ring of pale bristly hairs, strongly bilabiate, the upper lip broadly low-triangular with 3 low apical teeth, the lower lip longer, of 2 subulate-triangular teeth. Corolla 12-14 mm. long, ca. 7 mm. from base to sinus base, very bilabiate, the upper lip projecting forward and bent upward at its apex, oblong, emarginate, the lower lip bent downward then spreading into 3 lobes, the median largest (2-4 mm. long), obcordate; corolla surfaces minutely pilose, lavender, the lower lip internally toward the middle yellowish-white with spots of purple. Stamens 4, of 2 lengths, the slender flattish white filaments arching upward under the upper corolla lip, 1 pair to just short of its tip, the anthers short, blocky, purplish, the sacs parallel, basifixed. Style slender, forking at the level of the anthers into 2 linear stigmatic lobes.

Distribution and Flowering Season

Sandy flats and sandhills scrub, southern part of Central Highlands of peninsular Florida. Flowering all year.

Special Identifying Features

This is probably the rarest species of Conradina, taxonomically closest to C. canescens, but shorter-leaved and with a smaller middle lobe on the lower corolla lip. It appears to be spatially isolated from the other Conradinas.

## Habitats and Management Implication

The shrubs are part of a sandhills scrub type common to the lakes country of southern peninsular Florida. Such scrubland is populated by a scattering of Sand Pine, Longleaf Pine and Slash Pine, interspersed with various evergreen scrub oaks, Florida Hickory, Persea, Ilex, etc. In clearings of deep sand appear the Conradina shrubs, these intermingled with bunchgrasses in the genera Andropogon, Panicum, Aristida, Selaginella arenicola, various Polygonella, Garberia, etc. Openings created by clearcutting or fire would tend to increase the shrubs, by reducing or eliminating competing woody vegetation, but subsequent planting to pine would shade them out. The greatest threat to the species is the clearing of the scrub for either housing or orange groves.

## References

Shinners, L. H. 1962. Synopsis of Conradina (Labiatae). Sida 1 (2): 84-88.

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Revised March 1980

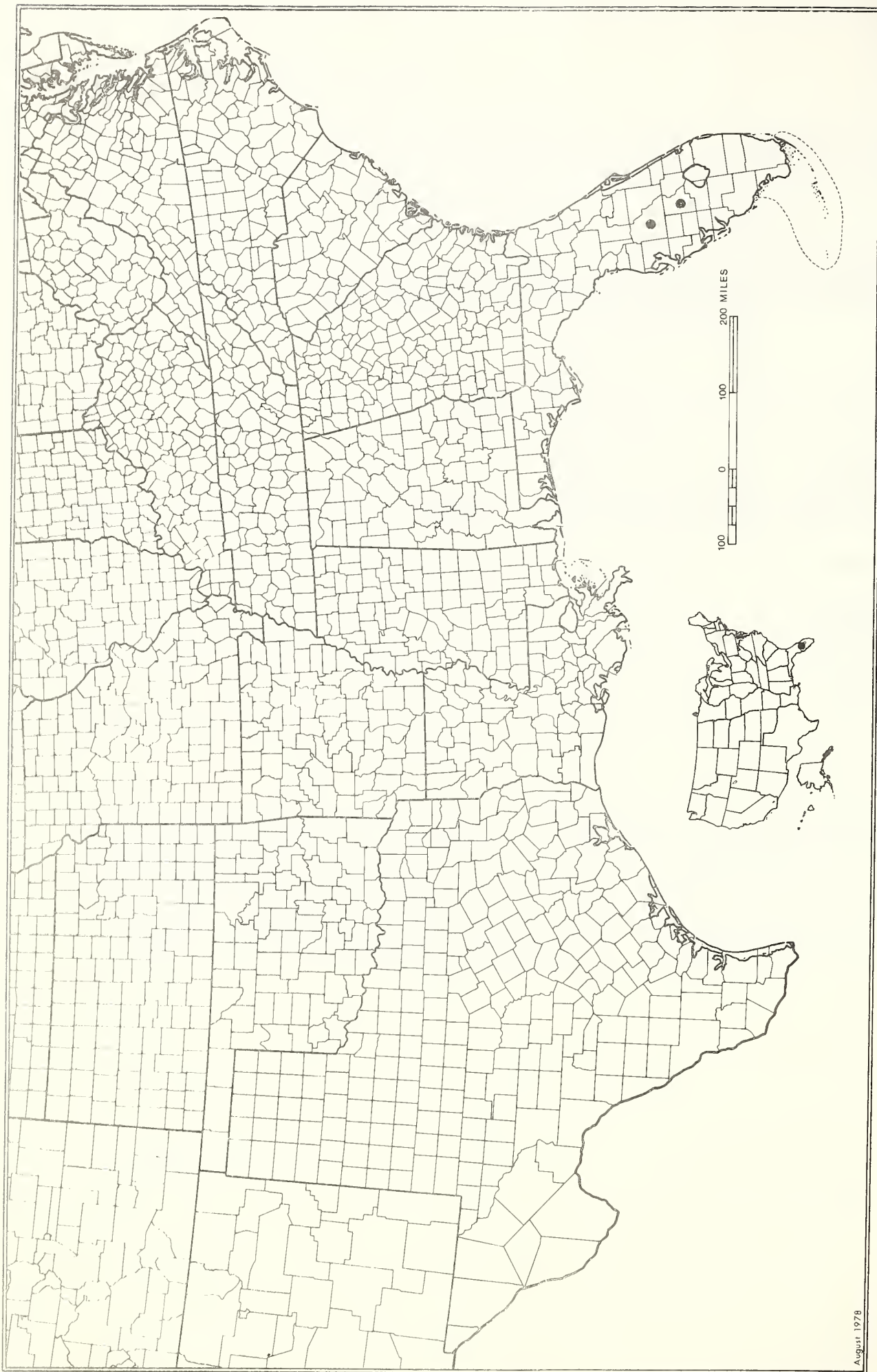
SPECIES: #60 Conradina brevifolia Shinnery; Short-leaved rosemary

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect								?
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 60. *CONRADINA BREVIFOLIA*

LAMIACEAE

Conradina verticillata Jennison; whorled-leaved rosemary

Technical Description

Strongly mint-smelling, perennial shrubs, the woody roots producing a mat of sprawling-based branching shoots which often root from the lower nodes.

Stems.--Shoots and branches arch upward, becoming erect, the primary shoots often to 5 dm long, the leafless lower portions with loose, brownish bark, the newer growth slender, quadrangular, the angles prominent but rounded, reddish-brown, the interfaces flat, greenish, the surfaces covered with small, erect or upwardly curved pale hairs. Branchlets leafy from near their bases.

Leaves.--The leaves narrowly linear, spreading or erect, opposite, mostly 2-3 cm long, blunt, somewhat fleshy with strongly revolute margins, narrowing to short, clasping-based petioles; upper surface smooth, gland-dotted; lower surface white-puberulent on either side of a strongly raised, smoothish midnerve.

Inflorescence.--Flowers on short-stalked, linear-bracted, axillary cymes from most or all upper nodes, the cyme stalks hispidulous, the bracts covered with long spreading, gland-tipped hairs. Pedicels spreading or erect, slender but stiff, to 4 mm long, pilose with gland-tipped hairs.

Flowers.--Calyx in flower 6-8 mm long, greenish maroon, tubular-campanulate, strongly ribbed, softly pilose with gland-tipped hairs, the upper lip ca. 3 mm long, its tip upswept and tridentate, the lower lip projecting forward and upward ca. 4 mm long, divided to near its base into two triangular-subulate teeth, the calyx tube at its orifice inside bearing a strong ring of erect whitish hairs. Corolla 2.0-2.5 cm long, bent somewhat upward at the apex of its tube into a funnellform throat, strongly bilabiate, the upper lip about 5 mm long, arching forward, convex backed, oblong, emarginate, the lower lip fully 6-8 mm long, directed downward and spreading into 3 lobes, the median largest, obcordate, the outer surfaces pale to deep lavender, paler toward the base, overall pilose, the inner surface of the mid part of the lower lip nearly white or yellow-white with a flecking of deep purple. Stamens 4, of 2 lengths, arching upward on slender, white, flattened filaments under or slightly beyond the tip of the upper corolla lip, the short anther sacs widely separated by connective. Style elongate, slender, forking at level of anthers.

Fruit.--Nutlets nearly round, dark brown, smoothish, ca. 1 mm long.

Distribution and Flowering Season

Bars, bluffs and banks of streams and rivers, in the Cumberlands of Tennessee and Kentucky. Flowering in May and early June.

Special Identifying Features

This species is well separated geographically from the other four described species of Conradina, which are confined to the southeastern Coastal Plain. It is

distinguished taxonomically by its decumbent habit, its longer leaves, its long-glandular-hairy calyx tubes (versus short-hairy or smooth).

#### Habitats and Management Implications

C. verticillata is commonly found on seasonally inundated banks and bars of clear, swift Cumberland streams, extending occasionally inland on sandy loamy ground of wooded, adjacent bluffs. Its woody roots are in sandy silt or sandy silt loams. The shrubs are usually in full sun, intermixed with Hypericum, various grasses and sedges, amongst shrubs such as Viburnum cassinoides, Cornus, Spiraea, bush Hypericum, Itea, etc. The banks and bluffs are typically forested by a mixture of cove hardwoods, eastern hemlock, white pine, shortleaf pine. The sandy substrates have a flora that reflects an at least somewhat acid reaction (ericaceous shrubs are also often associated).

The steepness of the topography, and its rockiness, lessen the usefulness of clear-cutting practice, most of the logging taking place in the area involving removal only of scattered merchantable trees. The greatest hazard to the species appears to be from the damming up of some Cumberland streams (which floods out the large populations of the bars and banks) as well as wholesale clearing for the purpose of putting in resort and retirement housing. Most of the presently known populations of the species are not in State or Federal ownership, which at present vastly heightens the risk of their maintenance. Large areas within the Cumberlands are, or have been, strip-mined for coal, the subsequent degradation of habitat along streams in the area constituting still another threat to C. verticillata.

#### Selected Readings

Shinners, L. H. 1962. Synopsis of Conradina (Labiatae). Sida 1 (2):84-88.

Jennison, H. M. 1933. New species of Conradina from Tennessee. Journ. Elisha Mitchell Soc. 48:268-269.

Small, J. K. 1933. Manual of the southeastern flora, 1166-1167.

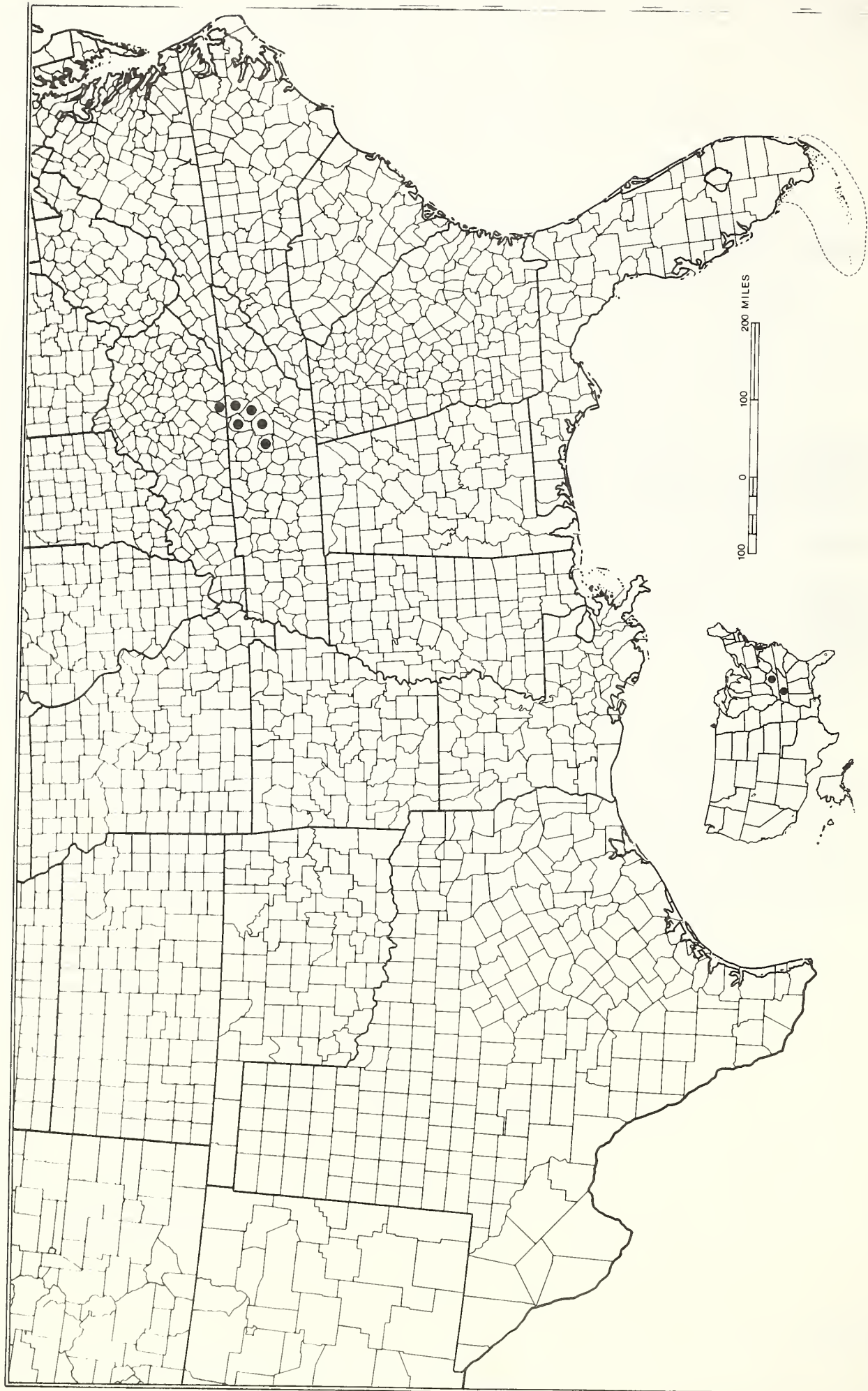
SPECIES: #61 Conradina verticillata Jennison; whorled-leaved rosemary

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy						X	X	
Damage								
No lasting effect	NA	NA	NA	NA				?
Beneficial if done properly					X			

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

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August 1978

MAP 61. *CONRADINA VERTICILLATA*

Text by R. Kral  
Map by A. Robinson

# LAMIACEAE

## Dicerandra frutescens Shinnery; Shrubby dicerandra

### Technical Description

Aromatic low shrubs from woody taproots, the older plants forming dome-shaped bushy growth of ascending, spreading, rarely erect shoots to 5 dm. long.

Stems: Bark of old wood dull brown or gray brown, thin, splitting into small grayish thin plates. New shoots, sterile mixed with fertile, arising from spreading or sprawling old wood, mostly erect or ascending from decumbent bases, some strictly leafy and usually shorter than the equally leafy fertile ones, greenish or with tints of maroon; smooth or puberulent at nodes or in the inflorescence, quadrangular, the angles rounded, the surfaces gland-dotted.

Leaves: Opposite, linear, needle-like, the larger ones mostly 1.5-2.5 cm. long, 1.0 mm. or less broad, callus-tipped, entire, nearly sessile, fleshy, copiously gland-dotted, smooth, pale green, spreading or ascending, usually bearing in their axils short leafy shoots making growth appear whorled.

Inflorescence: Flowers single or in 2's or 3's in simple cymes in narrow erect inflorescences, the peduncles spreading, with short, erect, leafy bracts, the pedicels erect or nearly so, 3-5 mm. long, minutely white-puberulent.

Flowers: Calyx in flower about 8 mm. long, asymmetrically cylindrical (the base expanded in fruit), bilabiate, the tube longer than the lobes (ca. 6 mm. long), strongly 10-13-nerved, gland-dotted, greenish on the lower surface, maroon-tinted above, the orifice and lobes white with tints of pink; rimmed internally with a ring of erect hairs; upper calyx lip slightly shorter than the lower, projecting forward, arching upward at the broadly rounded tip which is made up of 3 very small, converging teeth; lower lip divided nearly to its base into 2 narrowly triangular-subulate teeth, these projecting forward, curved upward apically. Corolla strongly bilabiate, 1.5-1.6 cm. long the narrow tube about equal to the throat and lips, yellowish-white, abruptly downwardly bent into a short-funnelform throat; upper corolla lip shorter than the lower, broadly oblong-ovate, retuse, projecting forward, arching slightly upward, slightly keeled; lower corolla lip projected downward, broadly obovate, with 3 prominent broadly short-oblong lobes, the median slightly longest; corolla surface appressed-puberulent with short pale hairs, the throat and lips yellowish-white to lavender or lavender-rose, the lips medially freckled with dark purple spots or short lines. Stamens 4, the slender filaments projecting beyond the corolla tips (exserted), of 2 lengths, the divergent ovoid anther sacs each with a subulate horn. Style elongated beyond the anthers, slender, scattered puberulent, with 2 slender, sharp-tipped stigmatic lobes.

Fruit: Nutlets 4, nearly round, about 1 mm. long, pale brown, smoothish.

### Distribution and Flowering Season

Sandridges, in sandscrub, interior peninsular Florida; flowering September and October.

## Special Identifying Features

This species and D. immaculata are the only two in the genus which are perennial and shrubby. It differs from the latter in its denser growth, its narrower and fleshier leaves, its purple-dotted (rather than spotless) corollas and its smooth (rather than minutely puberulent) anther horns.

## Habitats and Management Implication

D. frutescens is locally abundant in the sandscrub of Highlands, Sumter, Marion counties, usually in and around the Sand Pine-evergreen scrub oak type, where it may dominate the low shrub layer of open stands, clearings, or adjacent sandy places. In association are usually various Polygonella, Lechea, bunchgrasses in genera Panicum, Aristida, Andropogon, various legumes, particularly in the genera Galactia, Rhynchosia, Lespedeza, Desmodium. It is always rooted in very deep, well drained fine sands, in what is called "white sand" scrub.

Clearcutting of the Sand Pine overstory affects it favorably, as probably does fire, in that in either case shade is removed. Plants are often abundant along plowed firelanes, fencerows, and roadbanks, an indication that it spreads readily into such exposed sites. It is not however found in areas cleared for pasture, or areas in which wholesale site preparation has taken place. It is threatened most by clearing of the scrub for orange groves and various sorts of housing.

## References

Lakela, O. 1963. Dicerandra, in Sida 1 (3): 184-185.

Shinners, L. H. 1962. Synopsis of Dicerandra (Labiatae). Sida 1 (2): 89-91.

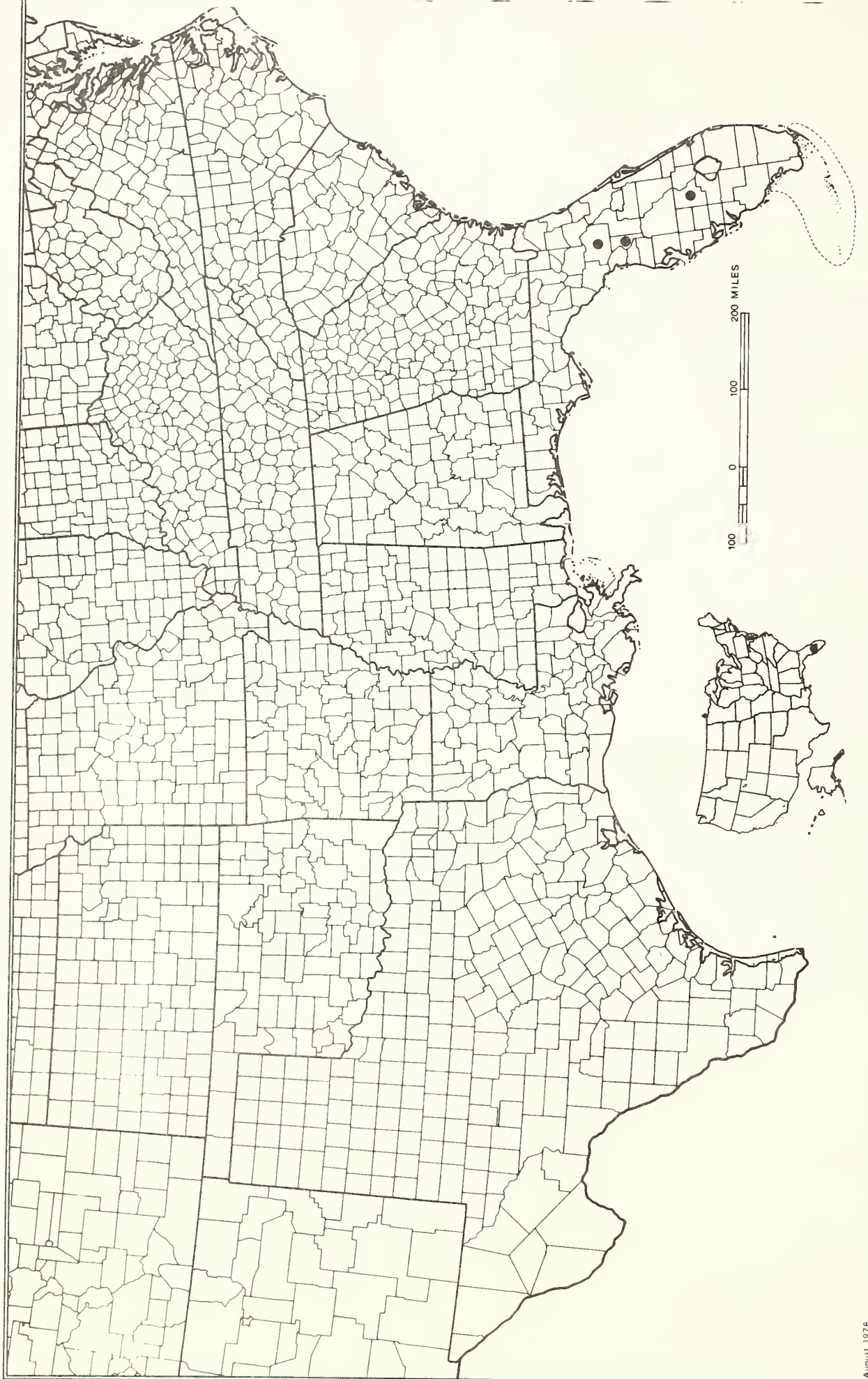
SPECIES: #62 Dicerandra frutescens Shinnery; Shrubby dicerandra

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	X
Damage								
No Lasting Effect			NA					
Beneficial if Done Properly	X	X			X	X		

Other Comments: Leave a seed source somewhere

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 62. *DICERANDRA FRUTESCENS*

LAMIACEAE

Dicerandra immaculata Lakela; Spotless-petaled dicerandra

Technical Description

Aromatic low shrubs from woody taproots; young specimens erect or nearly so, strict or sparingly branched; old specimens producing numerous erect, spreading or ascending shoots from spreading-branched older wood, the whole bush forming a domeshaped mass to 4 dm. high, 5-6 cm. across.

Stems: Bark of old wood gray brown, thin, a system of flattish, loose interbraiding plates; new shoots simple or sparingly ascending-branched, toward the base reddish-brown and smooth, toward the apex green, smooth save for puberulent nodes or even puberulent throughout toward very tips.

Leaves: Opposite, but usually with short leafy shoots making leaves appear whorled, the blades linear, linear-elliptic, linear-oblong, or narrowly oblong, the longer ones toward the base of new growth mostly 1.5-2.5 cm. long, at most 3.5 mm. broad, acutish with a callused tip, entire, the bases cuneate or attenuate, sessile or nearly so, the midrib or short petiole puberulent, the surfaces otherwise smooth, pale green, densely gland-dotted and with only the midnerve evident. Foliage leaves gradually shortening upward, grading into erect bracteal leaves.

Inflorescence: Flowers produced singly or in 3's from most or all mid and upper axils, forming a narrow system of ascending-stalked erect flowers or small cymes. Flower stalks slender but stiffish, puberulent.

Flowers: Calyx 8-9 mm. long, asymmetrically cylindrical, mostly 10-12-ribbed, bilabiate, the tube longer than the lips, strongly gland-dotted, the upper lip shorter than the lower, its broadly rounded apex made up of 3, narrow, short, sharp, converging lobes, the lower lip of 2, narrow, sharp-pointed, upwardly arching teeth; calyx surface toward base pale green, upwardly with maroon or purple tints and toward the tip white or pink, bearing within at the tube apex a strong ring of whitish hairs. Corolla strongly bilabiate, about 1.5-2.0 cm. long, the lips about as long as the tube and throat; corolla tube white, narrowly tubular, expanding into a broadly funnel-shaped throat; upper lip broadly oblong, retuse, projecting forward, the back rounded; lower lip directed downward, 3-lobed, the laterals spreading sideward, the median lobe largest and retuse; corolla surface externally white at the level of the tube, the throat and lips lavender-rose or purplish or rarely white, spotless, and with throat and lips white-puberulent. Stamens 4, of 2 lengths, the slender, violet filaments projecting the anthers beyond the corolla tips, the divergent anther sacs purplish each with a very slender, spreading minutely puberulent horn. Style slender, exserted, its forked tip projecting beyond the stamens.

Fruit: Nutlets 4, nearly round, about 1 mm. long, nearly smooth, pale brown.

Distribution and Flowering Season

Fine sands of ancient dunes near the coast, southeastern peninsular Florida (St. Lucie and Indian River counties); flowering in September, October.

## Habitat and Management Implication

This recently discovered and rare species is found in light shade of, or clearings in, sand scrub. The dominant trees are Sand Pine, various evergreen scrub oak (mostly Q. virginiana, Q. chapmanii, Q. myrtifolia), Florida Hickory, with admixtures of Ximinea, Serenoa, Bumelia, Lyonia, etc. It may be in direct association in sandy clearings with Opuntia, various bunchgrasses in genera Panicum, Aristida, Andropogon, Digitaria, pinweeds, jointweeds, and the rare Conradina grandiflora. While it is most often in evergreen scrub, it may be also found along the ecotone to longleaf pine-turkey oak, and in any case is always on deep sands and often where there are expanses of bare sands. These bare sands are probably created through a combination of wind action and/or fire. In that the growth of this species is most luxuriant in full sunlight, less so and more scraggly in the shade of the Sand Pine and other tree species, it would appear that it is shaded out as the overstory of trees and other scrub increases. Areas of disturbed sandy soils in the vicinity of its few existing populations show no evidence of reoccupancy by this Dicerandra, which appears to have few (if any) weedy tendencies.

The greatest threat at present to this species is in the rapid expansion of the many small residential and commercial communities that are springing up on the line of ancient sand dunes between Vero Beach and Ft. Pierce. Because of this the species is near extinction.

## Reference

Lakela, Olga. 1963. Dicerandra immaculata Lakela, sp. nov. (Labiatae).  
Sida 1 (3): 184-185.

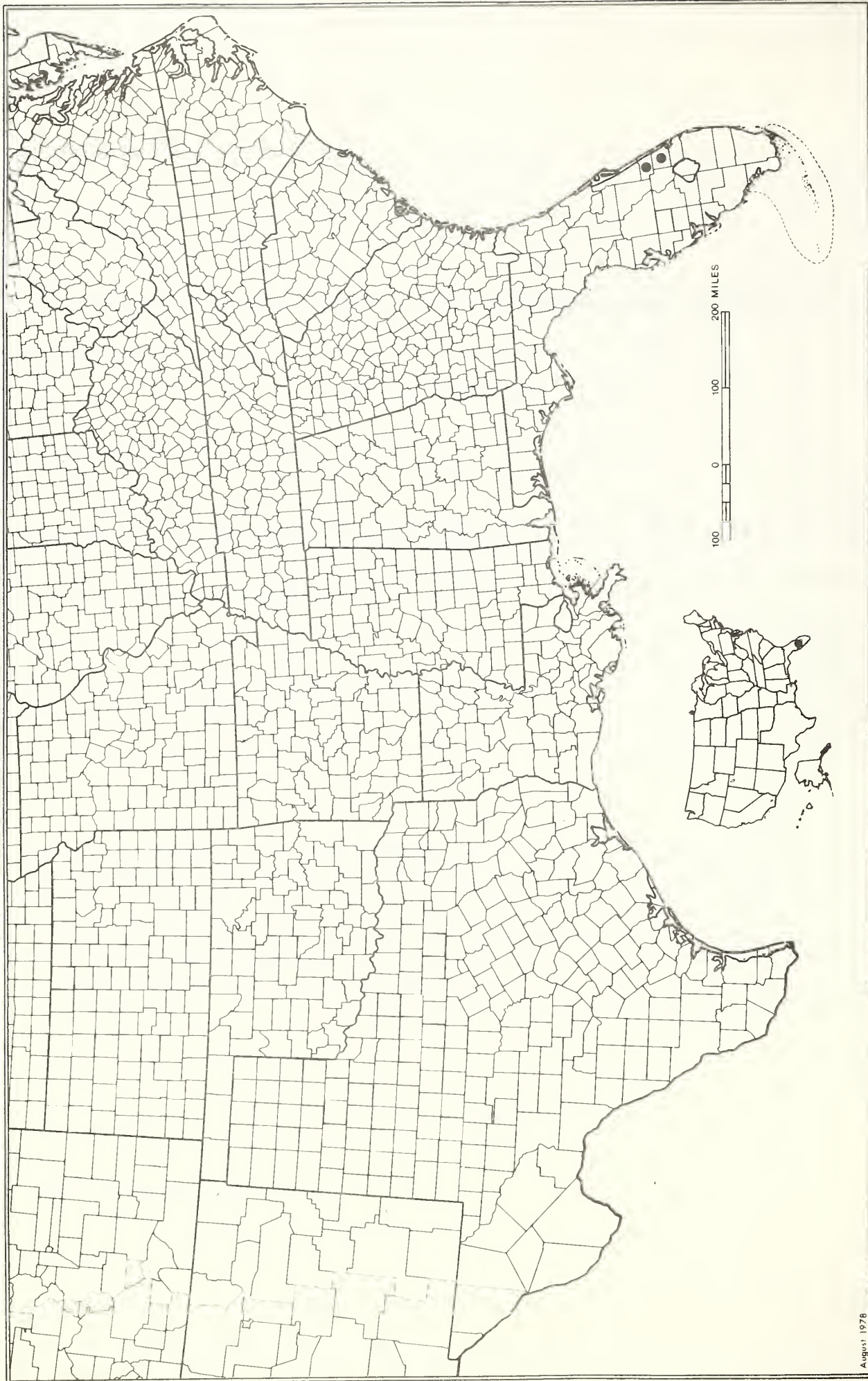
SPECIES: #63 Dicerandra immaculata Lakela; Spotless-petaled dicerandra

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy			X	X			X	
Damage								
No Lasting Effect		?						?
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 63. *DICERANDRA IMMACULATA*

LAMIACEAE

Hedeoma graveolens Chapm.; Mock pennyroyal  
Stachydeoma graveolens (Chapm.) Small

Technical Description

Perennial aromatic shrubby herbs from a short, caudex-like crown and either a branched taproot or diffuse system of rather stout primary roots.

Stems: Shoots usually numerous, from rather strict to copiously branched at least toward the base, the primary shoots mostly decumbent-based, all leafless toward the base, nearly round in cross section, smoothish with a thin, dull brown or gray brown bark, the newer growth and branches mostly erect or ascending, slender but stiffish, pale brown to dull green, or maroon, densely puberulent with a mixture of gland-tipped hairs and flattened, blunt, scale-like hairs, and upwardly also hirsute, with the upper growth usually concealed by overlapping leaves.

Leaves: Numerous, opposite, the pairs more distant proximally on the stem, overlapping and gradually smaller toward the stem tip, mostly ovate, the larger mostly ovate, rarely oblong, sessile 1 cm. or less long, acute, revolute, the margin coarsely low-serrate, crenate or entire, dark yellow-green sometimes with tints of purple, the surfaces with glistening sessile glands and minute stalked glands, usually (particularly upper leaves) hirsute, particularly toward and along the margins.

Inflorescence: Flowers solitary or few in the axils of all or most median and upper leaves, the short, (2-3 mm.) erect glandular-puberulent stalks mostly hidden by leaves.

Flowers: Calyces ascending or horizontal, campanulate-cylindric, about 5 mm. long, strongly ribbed, gland-dotted and glandular-puberulent, also hirsute, strongly bilabiate with the lips about equalling the tube, the upper lip short-oblong with 3 triangular acute lobes, slightly shorter than the lower lip, this cleft near to the base into 2 forward-and-upward-arching, narrowly triangular, subulate, hirsute teeth and bearing a ring of hairs within at the orifice. Corolla about 1 cm. long, the narrowly tubular base expanding level with the calyx lip sinuses into a funnelform throat, distinctly bilabiate, the upper lip oblong, emarginate, arching forward with its back rounded, the lower lip bent downward and flaring into 3 lobes, the laterals spreading downward, the median largest, broadest and 2-lobed apically: surfaces puberulent, the throat and lobes purplish, the lower lip medially with a strong yellowish-white band, this mottled with dark purple. Fertile stamens 2, accompanied by 2 minute stamodia, the fertile filaments attached to either side just below the lip sinuses, arching under the upper lip with the anthers projected just beyond; anther sacs short-oblong, nearly parallel. Style slender, elongate, its tip coiled under the upper lip of the corolla.

Fruit: Nutlets nearly round, about 0.5 mm. long.

## Distribution and Flowering Season

Low sand ridges, pine-palmetto flatwoods, edges of bay swamps, northwestern Florida; flowering May into September.

## Special Identifying Features

There are but 2 shrubby Hedeoma in the southeastern area, this and H. drummondii Benth., a western species which enters our area only in the Black Belt and which has much narrower, often petiolate, leaves.

## Habitats and Management Implication

H. graveolens is rooted in sands or sandy peats of lower parts of Longleaf Pine-turkey oak sandridges, in Longleaf-Slash Pine-Wiregrass-Saw Palmetto-Gallberry, or sandy margins of bayswamps, usually in association with a variety of savanna grasses and sedges, composites, and various shrubby heaths. It is most abundant where there has been a recent history of fire, and appears to diminish in numbers and luxuriance where fire is absent for extended periods. It may invade pine plantations as these open up with age, as their soils stabilize, or if these are burned.

## References

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Godfrey, R. K. Personal Communication, Sept. 1976.

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Revised March 1980

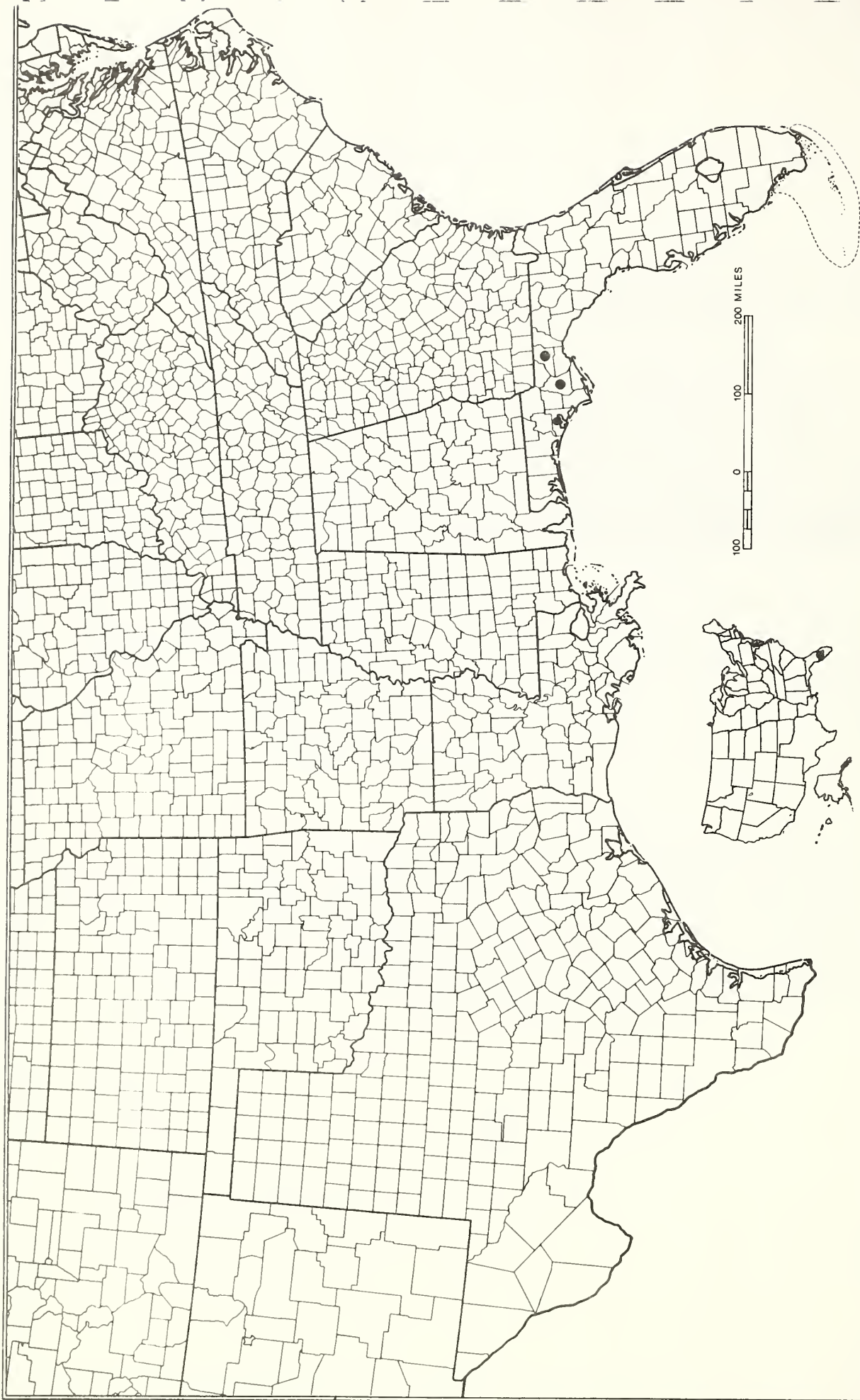
SPECIES: #64 Hedeoma graveolens Chapm.; Mock pennyroyal

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	
Damage		X	X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 64. HEDEOMA GRAVEOLENS

LAMIACEAE

Macbridea alba Chapm.; White birds-in-a-nest

Technical Description

Stiffish, erect, odorless perennial to 1 meter tall.

Stems: Simple or sparingly branched above, quadrangular, toward the base purplish, upwardly greenish, smooth or variously pilose.

Leaves: Opposite, rather well spaced, spreading-ascending, the lowermost longest and persistent, oblanceolate or spatulate, to 10 cm. long, 1-2 cm. broad, the tips rounded or obtuse, the margins distantly low-toothed, sinuate or entire, the bases attenuate or narrowly cuneate, running narrowly down the petiole to a clasping base, the surface smooth or pilose, pale green, gland-dotted; leaves gradually reduced in size up the stem, the upper ones sessile, often linear-oblong.

Inflorescence: A short, almost head-like spike, this solitary and terminal on a stiff peduncle projecting well above tips of uppermost leaves, or sometimes plants also producing spikes from axillary ascending branches from some lower nodes. Bracts imbricated, ovate to obovate, 1 cm. long, rounded, the inner smaller, sessile glandular, these concealing the flower bases.

Flowers: Calyx narrowly obovoid, about 1 cm. long, strongly bilabiate, green, gland-dotted, 3-lobed, the lobes slightly shorter than the narrowly campanulate tube and of equal length but the upper more narrowly oblong, all bluntish. Corollas spreading outward from bract summits, forming showy clusters, snow white, fully 3 cm. long, the narrow tubes expanding gradually into swollen, narrowly funnelform throats, these longer than the lips; upper corolla lip short-oblong, rounded, shallowly hood-like, projecting forward; lower lip directed downward, 3-lobed, with laterals narrowly oblong, spreading, the longer median broadest, all rounded. Stamens 4, in 2 different lengths, the flattened filaments with loose cottony hairs, arising low in the corolla, arching and ascending into the upper corolla lip to near its tip; anther sacs strongly diverging, with cottony hairs on their backs, the anther valve edges toothed minutely. Style slender, projecting slightly beyond the longest stamens, the 2 short, recurved lobes unequal.

Fruit: Nutlets narrowly obovoid, brown, to 4 mm. long.

Distribution and Flowering Season

Sandy peats of savanna-bogs in the pine-palmetto flatwoods of northwestern Florida; flowering May into July.

### Special Identifying Features

There are but two species of Macbridea, both of the Coastal Plain of the Southeast. The other species, M. pulchra Ell., has elliptic to linear-elliptic or lanceolate, thinner leaf blades with wingless petioles, and has rose-purple corollas.

### Habitats and Management Implication

M. alba is a plant of high hydroperiod soils, usually black sandy peats. Usually it is a part of fire savanna in Longleaf Pine, Slash Pine-Gallberry-Myrica-Saw Palmetto or in the lower reaches of Longleaf Pine-Wiregrass. Typically it is in grass-sedge bog formations created by flatwoods fires, and is in association with several other endangered species such as Verbesina chapmanii, Justicia crassifolia, Scutellaria floridana, Cuphea aspera, etc. None of these species persist where drainage is perfected and fire is kept out, though they may be increased by clearcutting. Mechanical site preparation reduces or eliminates them, and even bedding presents but a temporary solution in that the plants persisting in the pine rows are shaded out when crowns of plantation pines close.

### References

- Chapman, A. W. 1897. Macbridea, in Flora of the southern states, 3rd Ed. p. 387.  
Small, J. K. 1933. Manual of the southeastern Flora, p. 115.

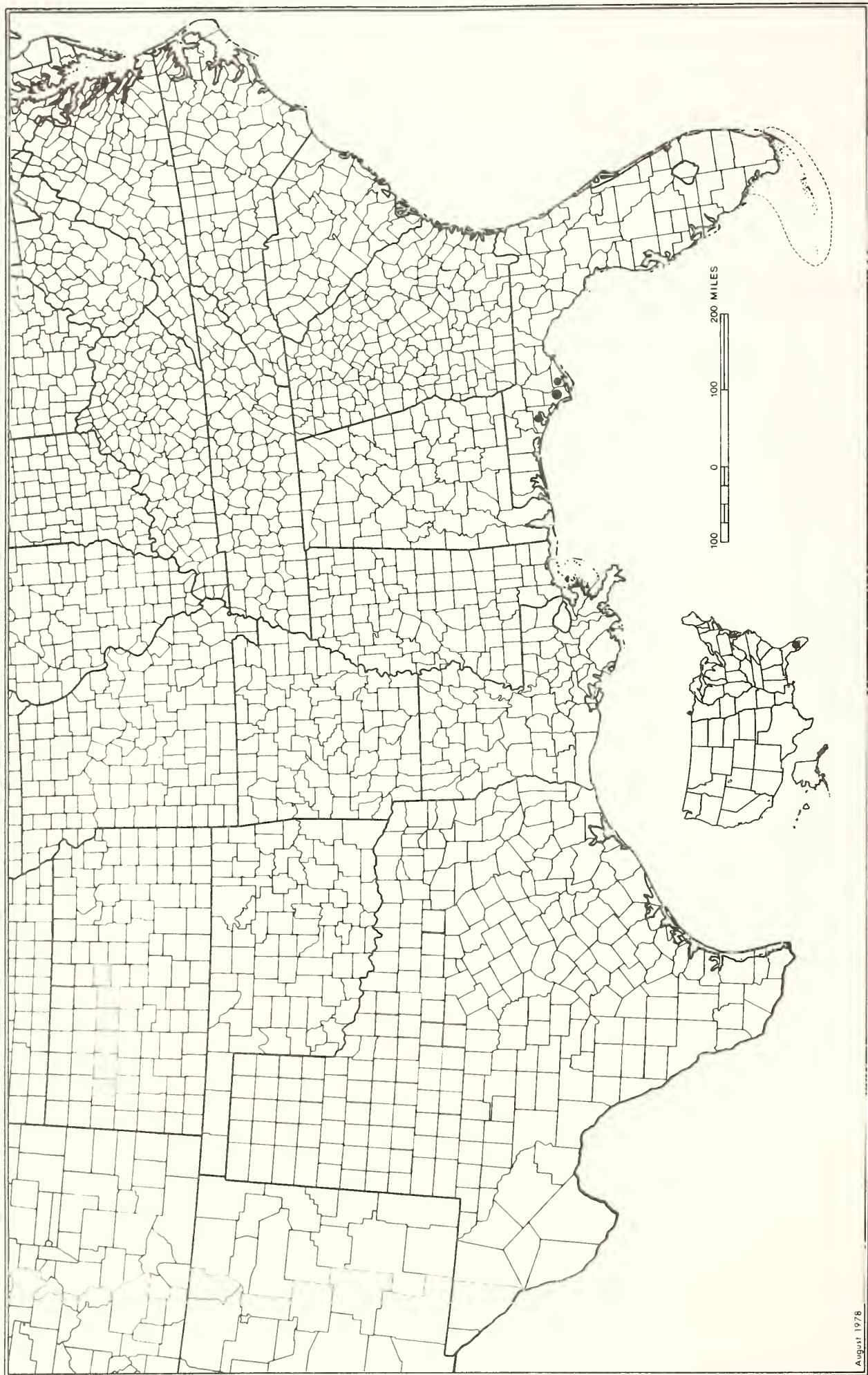
SPECIES: #65 Macbridea alba Chapm.; White birds-in-a-nest

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 65. *MACBRIDEA ALBA*

LINACEAE

Linum westii C. M. Rogers; West's flax

Technical Description

Perennial smooth herbs mostly 4-6 dm tall, usually several stems arising from a radiate system of short, thick, horizontal rhizomes.

Stems.--Stiffly erect or ascending from decumbent bases, simple below the inflorescence or branched only toward the base, smooth, toward the base mostly 2-3 mm thick, leafless and brownish, upwardly becoming green, throughout with four low wings on the internodes. Sterile, leafy offshoots sometimes present, these usually leafy to the base.

Leaves.--Mostly opposite, without stipular glands, usually absent from lower part of stem by flowering time, the largest at about midstem, erect, linear, oblong or oblanceolate, mostly 1.5-2.0 cm long, 1.5-3.0 mm wide, blunt to broadly or narrowly acute, entire, the bases short-acute, sessile, in size gradually reduced in length and narrower up the stem and grading into inflorescence bracts.

Inflorescence.--A terminal cyme of many flowers, these on short, ascending stalks mostly along one side of the upwardly arching inflorescence branches (a scorpioid cyme), each stalk 3-4 mm long, subtended by a single short-linear bract, ribbed, and with a faint "joint" about 1 mm below the flower.

Flowers.--Sepals 5, nearly equal, 3-4 mm long, the outer ovate, the inner broadly ovate, obovate or suborbicular, all short-mucronate, the margins thin, fringed with stalked glands (more conspicuously on the inner sepals), ascending, persistent around the fruit, the backs rounded and with a strong midrib, smooth, greenish with maroon tints. Petals 5, distinct, spreading narrowly obovate, bright yellow, unfolding in evening, 6-9 mm long. Stamens 5, the filament bases united; staminodia none. Ovary superior, ovoid, tipped with five slender, distinct styles.

Fruit.--Nearly round, sometimes slightly broader than long, short-beaked, 2.5-3.0 mm long, 2.8-3.0 mm broad, tan, splitting into 10 one-seeded segments (by false septae) which in shape resemble segments of orange, but dry, the septae lacking a marginal fringe. Seeds about 2 mm long, broadly crescent-shaped, laterally flattened and blunt-ended, brown.

Distribution and Flowering Season

Wet areas in pine flatwoods savannas, bogs, shallow ponds, in northern Florida (Baker, Calhoun, Franklin counties). Flowering in July.

Special Identifying Features

This species, in that part of the genus with distinct styles, is nearest L. macrocarpum and L. floridanum. It differs from both in its rhizomatous habit, its mostly opposite (rather than alternate) leaves, its rounder fruit.

## Habits and Management Implications

L. westii is locally abundant in pine flatwoods ditches, usually around Hypericum ponds or edges of pitcher plant bogs. The forest type is either longleaf - slash pine-gallberry-saw palmetto or Cliftonia-Cyrilla- (Ti-Ti), or pond pine-pond cypress-Nyssa biflora-Ilex myrtifolia. The plants are usually rooted in muck or sandy peat muck, often in shallow water and in association with Cyperus, Fimbristylis, Dichromena, Rhynchospora, Sagittaria graminea, and a variety of bog grasses. Thus, even during dryer periods, it is on ground that is normally at least moist.

It is a part of a savanna-bog community that thrives in full sun or partial shade and that disappears with drainage or with any mechanical site preparation either through disruption of the bog soil, or through shade of heavy stocking of pines. As is true for most other species in these types, L. westii has been maintained through periodic flatwoods fires. Management of this species requires preservation of some undrained area and undisturbed bog soils.

## Suggested Reading

Rogers, C. M. 1963. Yellow flowered species of Linum in eastern North America. Brittonia 15 (2):97-122.

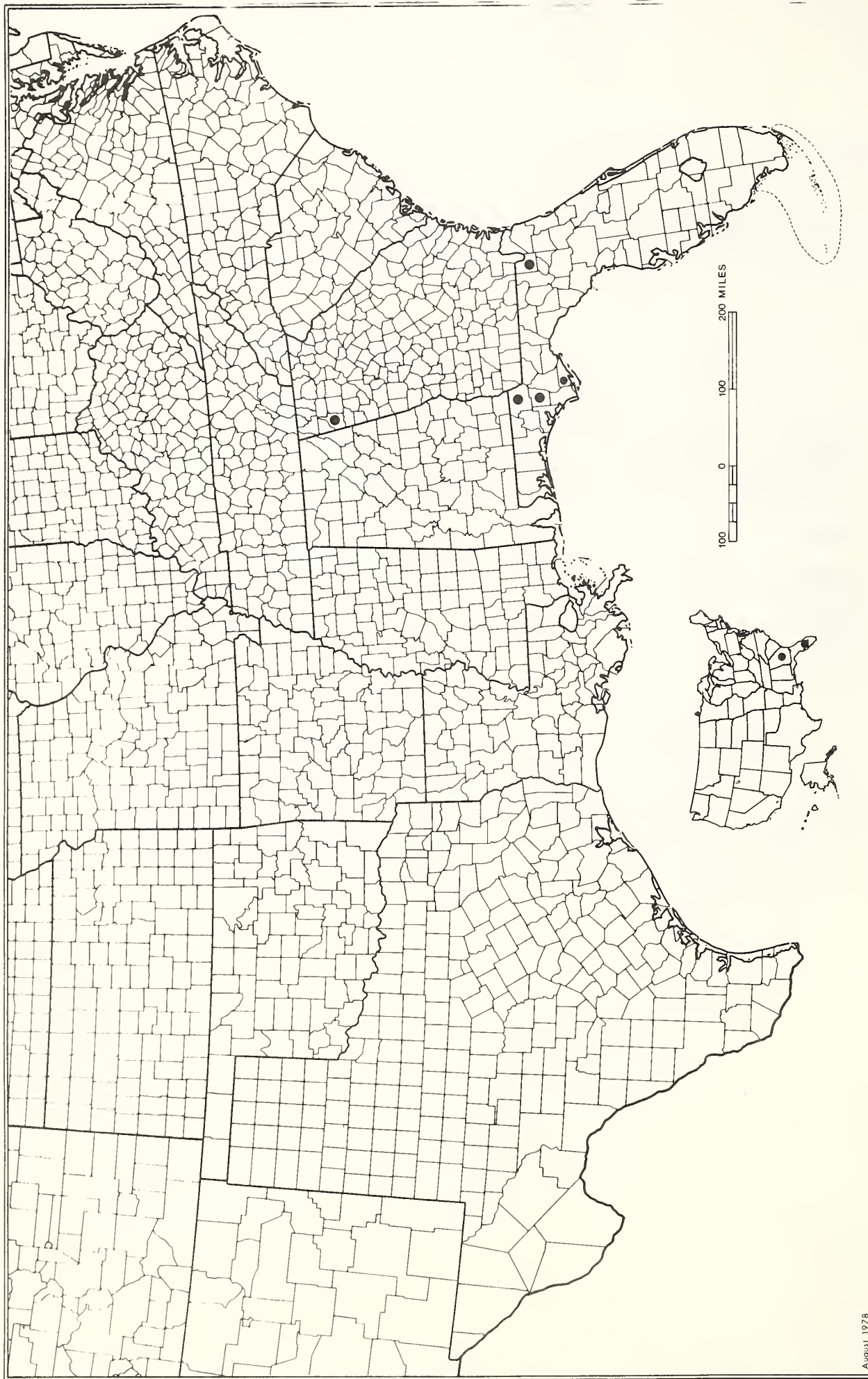
SPECIES: #66 Linum westii C. M. Rogers; West's flax

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		X		X			X	
Damage			X					
No lasting effect					X	X		
Beneficial if done properly	X							

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980



MAP 66. *LINUM WESTII*

MALVACEAE

Iliamna remota Greene; Kankakee globe-mallow  
I. corei Sherff

Technical Description

Perennial shrub, bushy branched, with several strong shoots directly from a woody rhizome.

Stems: Main stem erect, ascending-branched, at base up to 1 cm. thick, terete, pale green, stellate-hairy, mostly between 1 and 2 meters tall.

Leaves: Alternate, simple, with early deciduous, lance-triangular stipules, on spreading-ascending slender but stiffish stellate-hairy petioles 3-6 cm. long, the blades of size and outline similar to Red Maple, broadly ovate to suborbicular, mostly 5-10 cm. long, (3-) 5-7-lobed, the lobes triangular with the terminal longest, the sinuses sharp-based but with an angle of 90° or slightly more, the lobe tips acute, the margins serrate to crenate-dentate, the venation palmate, the base truncate to cordate, both surfaces green, stellate-hairy. Lowest leaves the largest (lowermost usually absent by flowering time), gradually smaller upward on stem and branches, grading into progressively smaller bracteal leaves which at tips of shoot are shorter than the buds.

Inflorescence: Flowers symmetrical, Hollyhock-like, solitary or in pairs from leaf axis and forming elongate racemes with the lowermost fruiting calyces well-separate. Flower stalks spreading-ascending, in bloom 5-10 mm. long or less, stellate-tomentose, bearing at their tips, just below the calyx, 2-3 linear, densely stellate-tomentose bracts up to 1 cm. long.

Flowers: Calyx in bloom broadly campanulate to about 1.5 cm. long, the 5 triangular lobes slightly spreading, longer than the calyx tube, acute, externally 3-nerved, the backs stellate-hairy, inside cottony-tomentose. Petals 5, pink spreading, inequilateral, broadly obovate, 2.5-3.0 cm. long, retuse or emarginate, entire, the bases cuneate or attenuate to a short claw, this bristly-ciliate. Stamens numerous, fused into a tube 7-8 mm. high which is paper thin save for 5 strong nerves, the free upper parts of the filaments spreading horizontally toward the tube apex to form a "ball" of short 2-locular anthers, these purplish. Ovary superior, the surface densely coated with pale, erect, bristly hairs, the slender style with about 10 branches at the level of the stamen tips and clavate-tipped. Carpels numerous, arranged in a lobed ring, when mature oblong, 8-10 mm. long, with papery, veiny, smooth sides, densely stiff hairy margins, there opening to shed 2-4 rounded seeds.

Distribution and Flowering Season

Rocky open woods, bars of rivers, at a few isolated stations, one in northern Illinois on the Kankakee River, one in Indiana, and two in western Virginia. Flowering from June into early August.

## Special Identifying Features

This small genus is primarily western and northwestern with only this one occurring east of the Mississippi River. The species would be distinguished from eastern Hibiscus, Gossypium and Kosteletzkya by having more than 5 carpels, from Althaea, Malva, Callirhoe etc. by having 2 or more seeds/carpel, and from Abutilon, etc. by its beakless carpels.

## Habitats and Management Implication

The two Virginia stations are both in the Valley and Ridge province, both in open, primarily oak-hickory Virginia Pine, Pitch Pine forest with understory of Crataegus, Amelanchier, Cornus, Acer, Kalmia. The best known locality is on Peters Mountain, where the plants often tend to be unbranched and lower than in the other localities. According to Sherff (1949) the Virginia plants have odorless flowers, in contrast to the fragrant ones of the Illinois plants. He considered this Virginia material at first to be a variety (I. remota var. corei Sherff) then later (l. c.) treated it as a distinct species on the basis of its lower habit, odorless flowers, and relatively narrower and longer terminal leaf lobe.

## References

- Gleason, H. A. and A. Cronquist. 1963. Manual of the vascular plants of northeastern United States and adjacent Canada, 461-467.
- Sherff, E. E. 1946. Notes on certain plants in the Gray's manual range. *Rhodora* 48 (569): 89-96.
- \_\_\_\_\_. 1949. Miscellaneous notes on dicotyledonous plants. *Am. Journ. Bot.* 36: 499-511.

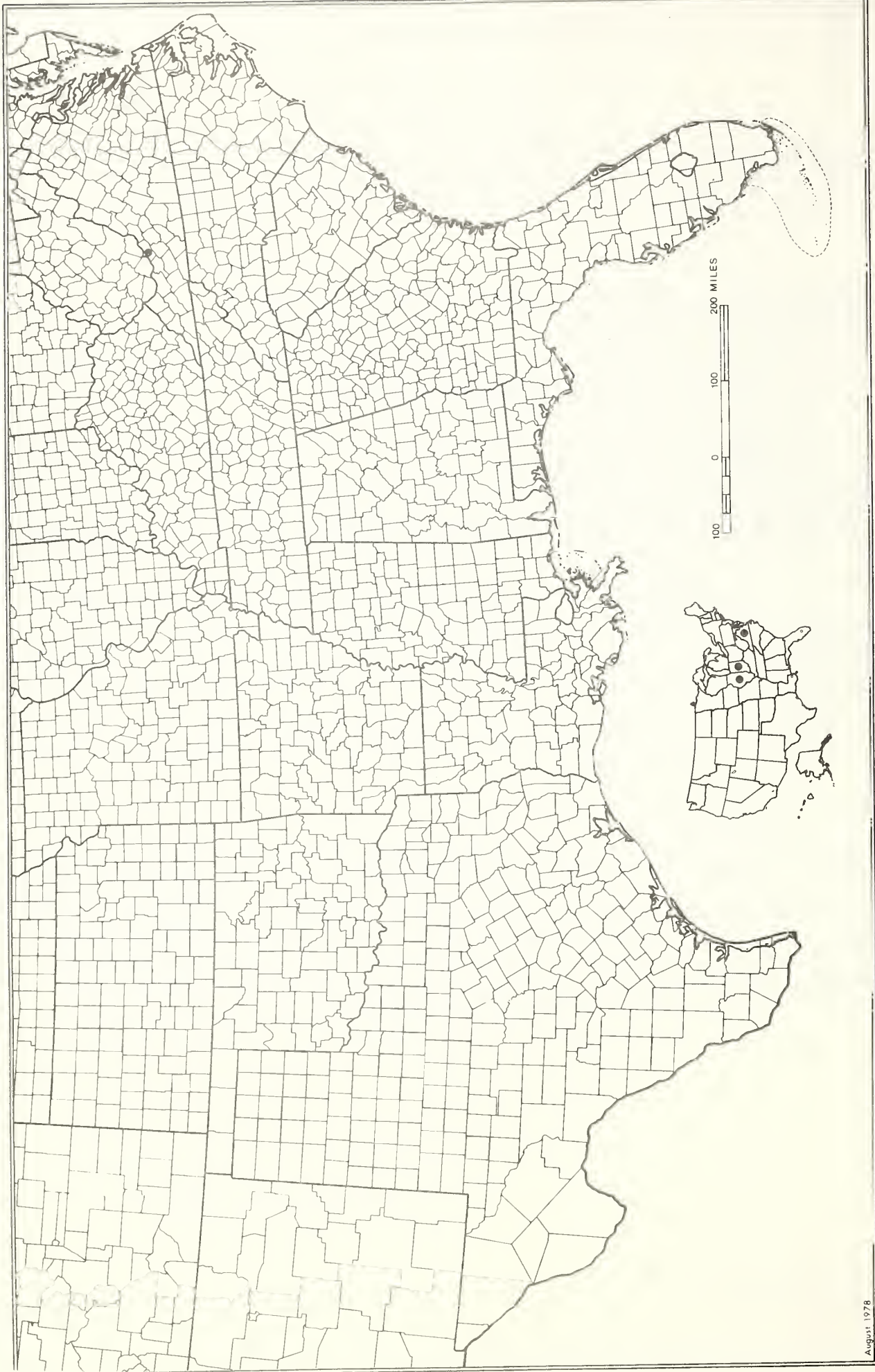
SPECIES: #67 Iliamna remota Greene; Kankakee globe-mallow

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X	X	
Damage								
No Lasting Effect								?
Beneficial if Done Properly					X			

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

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August 1978

MAP 67. ILIAMNA REMOTA

ASTERACEAE

Silphium brachiatum Gattinger; Cumberland rosinweed

Technical Description

Perennial, fully to 2 meters tall, fleshy-rooted, from a stout, nearly erect, fleshy caudex.

Stems: Erect, usually solitary, up from an overwintering rosette of large leaves, 1-2 cm. thick at base, smooth, terete, pale green, glaucous (with a bloom), slightly ribbed, sparingly branched or simple.

Leaves: Stem leaves opposite, spreading-ascending, the largest lowest, mostly on rigid, ciliate-margined petioles 5-8 cm. long, the blades triangular-ovate, 15-30 cm. long, coarse, narrowly acute or acuminate, the margins coarsely and saliently toothed, particularly toward the base, the base truncate or shallowly cordate (sometimes hastate), thus abruptly narrowed to the petiole; the upper surface dark yellow-green, harsh, lower surface paler, harsh; leaves upwardly gradually reduced in size, shorter-petioled, becoming entire and grading into scattered, lanceolate inflorescence bracts.

Inflorescence: Heads several to many, in an open, broad upwardly arching-branched cyme, the branches slender but stiffish, smooth, the heads themselves in fruit hemispheric, about 1.5 cm. high and 3 cm. broad across phyllary tips. Involucral bracts numerous, loosely overlapping, the largest median, ovate to broadly lanceolate or oblong, acute, about 1.5 cm. long, firm, spreading or erect, harshly ciliate, the backs green, smooth.

Flowers: Rays fertile, the ray corollas spreading, the ligules 1.0-1.5 cm. long, elliptic, pale yellow. Disc florets with corollas yellow, tubular with strong ribs and low-triangular bristly-hairy lobes, sterile.

Fruit: The akenes strongly flattened parallel to head center, broadly obovate to suborbicular, 5-7 mm. long, narrowly margined, with 2, low-triangular teeth at apical notch. Chaff longer than akenes, firm-cartilaginous-based, with acute to rounded, greenish, scabrid, eglandular tips.

Distribution and Flowering Season

Calcareous rocky clearings, Cumberland escarpment as it borders the eastern Highland Rim, Kentucky and Tennessee; northern Alabama. Flowering July into August.

Special Identifying Features

The rosinweeds are one of the most difficult genera in the Southeastern Area, attempted by many but as yet not conducive to a complete treatment. However, this is one of the few distinct species, combining (1.) a large stature with smooth, glaucous stems, (2.) large, coarsely toothed stalked leaves with ovate-triangular blades coarsely large-toothed and cordate or truncate based, (3.) and heads with phyllary backs smooth, akenes with narrow wings and shallow apical sinuses.

## Habitats and Management Implication

S. brachiatum is found in clearings, usually on sticky soil over limestones, usually rocky, in mixed hardwoodlands or in very open stands of hardwood, these admixed with Juniperus. It may be associated with plants of prairies or limestone glades such as Echinacea, Ratibida pinnata, various sunflowers, Andropogon gerardi, A. scoparius, Sorghastrum. Such habitats may be quite dry seasonally. Surrounding forest may be oak-hickory (with an infusion of Pinus echinata, P. taeda) enriched with Aesculus glabra, Tilia, Ulmus, Celtis, Robinia, Fraxinus (americana). The forest, though a limerocky woodland, produces trees of merchantable size and much of it shows effects of heavy logging.

In that this is a species of clearings, timber cutting has probably not affected it much, though grazing reduces it. Fire, not recommended as a management tool but nonetheless occurring, probably has no adverse effect on this species. The very rocky nature of the habitat precludes any mechanical site preparation methods so little can be stated as to the impact these might have on S. brachiatum.

## References

- Fernald, M. L. 1950. Gray's Manual of Botany, ed. 8: pp-1475-1477.
- Gleason, H. A. and A. Cronquist. 1963. Manual of vascular plants of north-eastern United States and adjacent L. Canada, pp. 689-690.
- Perry, Lily M. 1937. Notes on Silphium. Rhodora 39: 281-297.

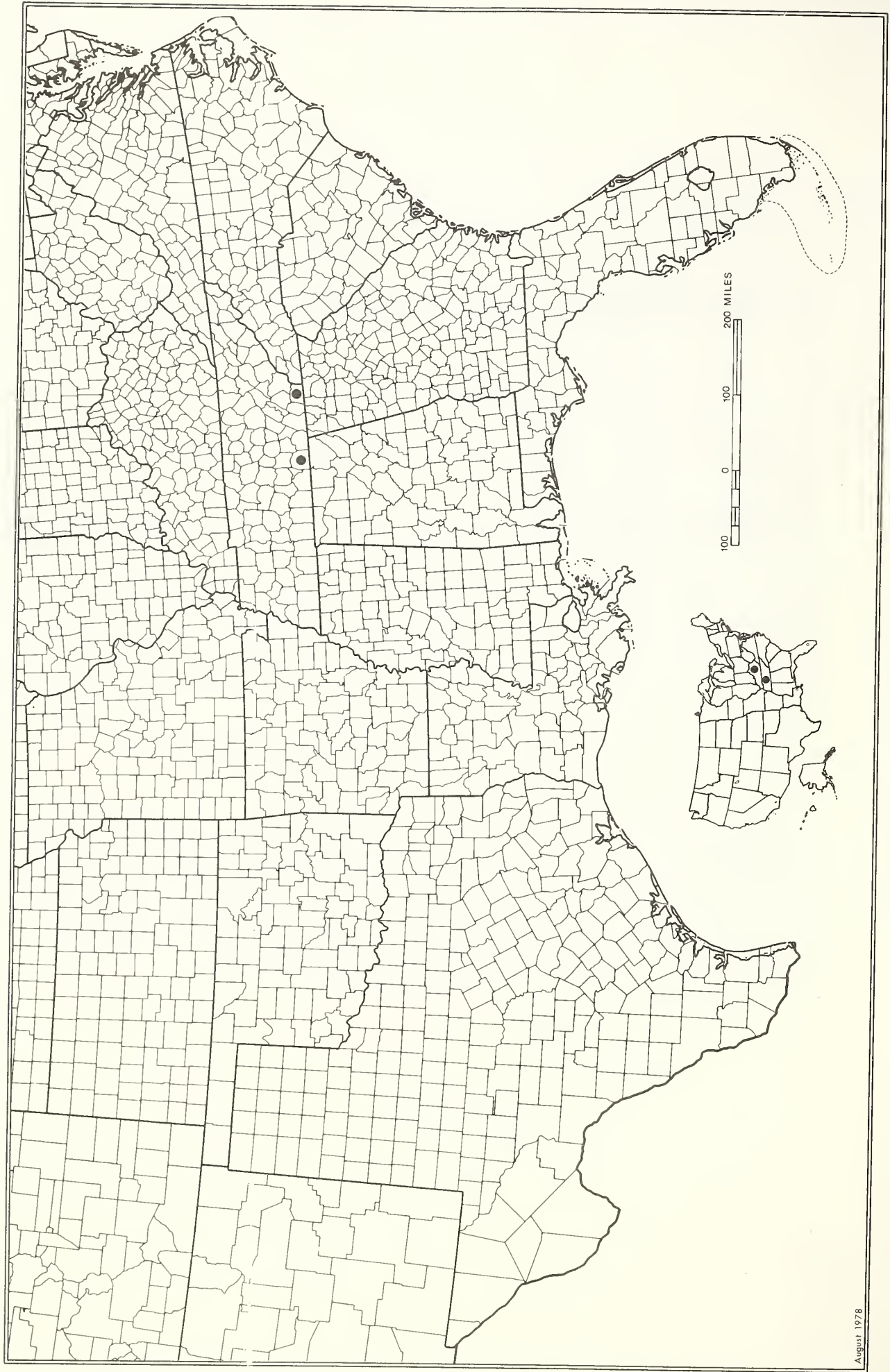
SPECIES: #71 Silphium brachiatum Gattinger; Cumberland rosinweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage		NA				X		X
No Lasting Effect								
Beneficial if Done Properly	X				X			

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 71. SILPHIUM BRACHIATUM

CARYOPHYLLACEAE

Paronychia chartacea Fernald; Paper-like nail-wort

Nyachia pulvinata Small

Technical Description

Low, annual, forming round mats of many branches radiating flatly from a strong taproot.

Stems: Shoots forking repeatedly from near the base, roundish, smooth, greenish, the internodes short, and with a broad band or two of reflexed pale hairs on the larger branches.

Leaves: Opposite, the lowest largest, ovate or oblong, rarely longer than 3 mm., blunt, entire, smooth, fleshy, strongly rolled (revolute), the bases sessile and somewhat auricled; leaf pairs grading gradually into narrower, shorter, bracts; all leaves stipulate, each stipule of a pair consisting of a brownish, somewhat swollen base, and terminating in an acutely jagged erect scale.

Inflorescence: Flowers regular, many, solitary or in clusters of 3, sessile, each subtended by a pair of fleshy oblong bracts, the whole inflorescence a compound system of cymes.

Flowers: Calyx of 5, erect or slightly spreading, oblong, yellow-green, cupped sepals less than 1 mm. long, each bearing on its convex outer surface toward the truncated tip a low-conic spur, the whole flower appearing obovate and truncate; sepal bases low-hairy. Petals 0. Stamens 5, opposite the sepals, each filament arising from a scale at a sepal base, the narrowly oblong anthers resting in the cup formed by the sepal apex. Ovary ovoid, slightly shorter than the sepals, the styles 2, shorter than the ovary but with stigma tips projecting slightly beyond the sepal tips.

Fruit: A very thin-walled obovoid utricle, the single seed ovoid, dark reddish-brown.

Distribution and Flowering Season

This whitlow-wort is found only in the sand scrub of ancient dunes in the lake region of southern peninsular Florida where it blooms and fruits from spring through fall.

Special Identifying Features

P. chartacea is part of that group of Paronychia which has the free portion of the sepals longer than the fused portion, and is further distinguished by its short styles, the bluntly conic sepal umbos (spurs) and its strongly revolute, fleshy leaves. It has the tiniest flowers of its group in the southeastern U.S.

Habitats and Management Implication

Paronychia chartacea, together with other sand stabilizers is found in the pure, white sand clearings or "blowouts" in the sandscrub. Where the scrub is removed

for the purpose of orange groves this plant does not usually occur. However, where fire lanes or roads are made, these revealing bare sands, the plants abound, just as they do where the scrub and orange groves meet. The species is definitely part of the lowest successional stages in the sandscrub, giving way when tall herbs, later shrubs take over. It is endangered primarily because of loss of habitat through orange groves and housing developments. Removal of the overstory through clear-cutting or fire, sufficient to create bare sand areas would tend to maintain this species, but "clean" orange groves develop another sort of weed flora with which this seems unable to compete.

#### References

- Fernald, M. L. 1936. Plants from the outer coastal plain. *Rhodora* 38: 414-452.
- Small, J. K. 1933. *Manual of the Southeastern Flora*, pp. 481.

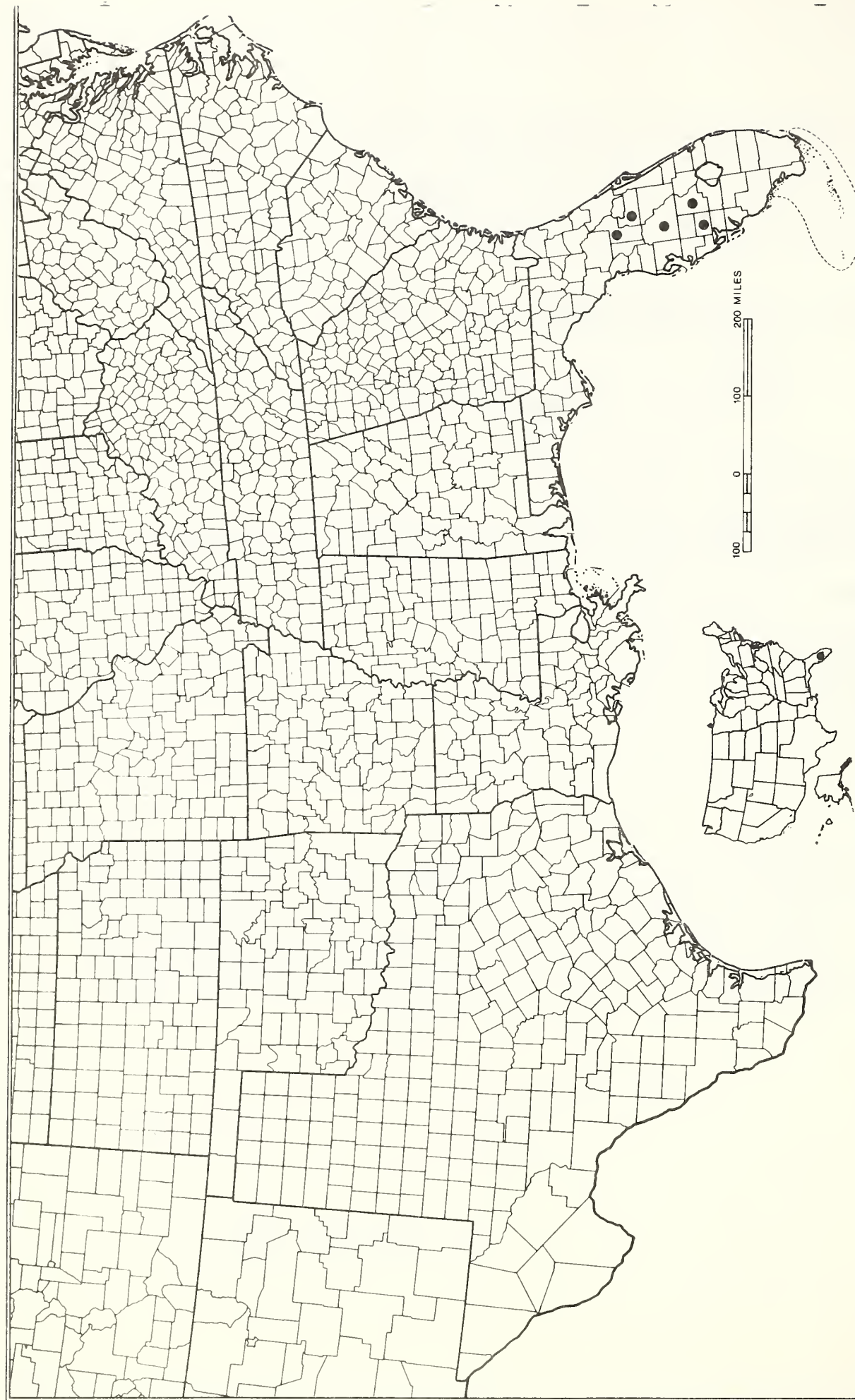
SPECIES: #74 Paronychia chartacea Fernald; Paper-like nail-wort

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	
Damage								
No Lasting Effect			NA					?
Beneficial if Done Properly	X	X			X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



August 1978

MAP 74. PARONYCHIA CHARTACEA

## HYPERICACEAE

Hypericum cumulicola (Small) P. Adams; Highlands scrub hypericum

Sanidophyllum cumulicola Small

### Technical Description

Taprooted, short-lived, smooth perennial.

Stems: The shoots few to several, arching-ascending or erect, wiry, slender, zig-zag at level of the flowers, the bark gray or reddish-brown on older growth, this peeling away in thin flakes, on newer growth reddish brown or greenish brown. New shoots arising toward bases of the old, forming short leafy tufts.

Leaves: New short shoot leaves decussate, (in 4 ranks), overlapping, fleshy, short-linear, glandular-dotted, rarely longer than 3 mm., blunt. Stem leaves short-linear, similar to those of short shoots but more distant upwardly on stems, grading gradually into flatter, sharper, paired bracts in the inflorescence.

Inflorescence: A forking, zig-zag system of narrow racemes, the flowers 1/node, arising on a short, thick, erect pedicel slightly shorter than the sepals.

Flowers: Perianth regular, the calyx of 5 subequal to unequal erect sepals, about 3 mm. long, these separate, oblong to narrowly ovate or elliptic, the tips blunt or broadly acute, the margins entire, the bases slightly fused. Petals yellow, spreading, oblong, 3-4 mm. long, rounded or slightly emarginate. Stamens numerous, in groups of 4, each cluster with filaments slightly fused toward the base. Ovary superior, 3-carpellate, lance-ovoid, with 3 styles, each tipped by a stigma button. Fruit: Capsule lance-ovoid or elliptical, ca. 4-4.5 mm. long. Seeds short-oblong, about 0.5 mm. long, dark reddish-brown, with several rows of fine pits.

### Distribution and Flowering Season

A species of the Sand Pine-evergreen scrub of southern peninsular Florida, blooming and fruiting throughout the year.

### Special Identifying Features

This species in several respects, particularly in its taproot and wiry, scaly-leaved stems, and in its flowers, resembles the Pineweed, H. gentianoides (L.) BSP. It differs in being perennial, having somewhat larger flowers with more numerous stamens, and in being more branched in the inflorescence.

### Habitats and Management Implication

Hypericum cumulicola is always on the deep sands of ancient dunes, either in clearings or "blowouts", and thus one of the many herbaceous species that play a role in early succession on such dunes. It probably has maintained its populations through occupation of small clearings produced by toppling of the sparse overstory species, or through seeding into larger clearings produced by fire.

Associated herbaceous cover is mainly Selaginella, Paronychia, mat-forming Euphorbias (Chamaecybe type), various dryland bunch-grasses such as Andropogon, Panicum, Aristida, Sorghastrum, some Cyperus and Rhynchospora.

Logging of the sort that would also remove the evergreen shrub understory, yet leave the sands themselves essentially undisturbed would favor the species providing adjacent seed sources are available. Burning would favor its increase, but is impracticable because of the dense, highly flammable nature of the scrub.

As is true of all other species in this complex, sclerophyllous community, the main risk is not so much from a cutting of the sparse pine-hardwood overstory as it has been from the wholesale creation of orange groves throughout the area or from the total eradication of the scrublands for the purpose of housing.

#### References

Small, J. K. 1933. Manual of the Southeastern Flora, pp. 874.

Revised March 1980

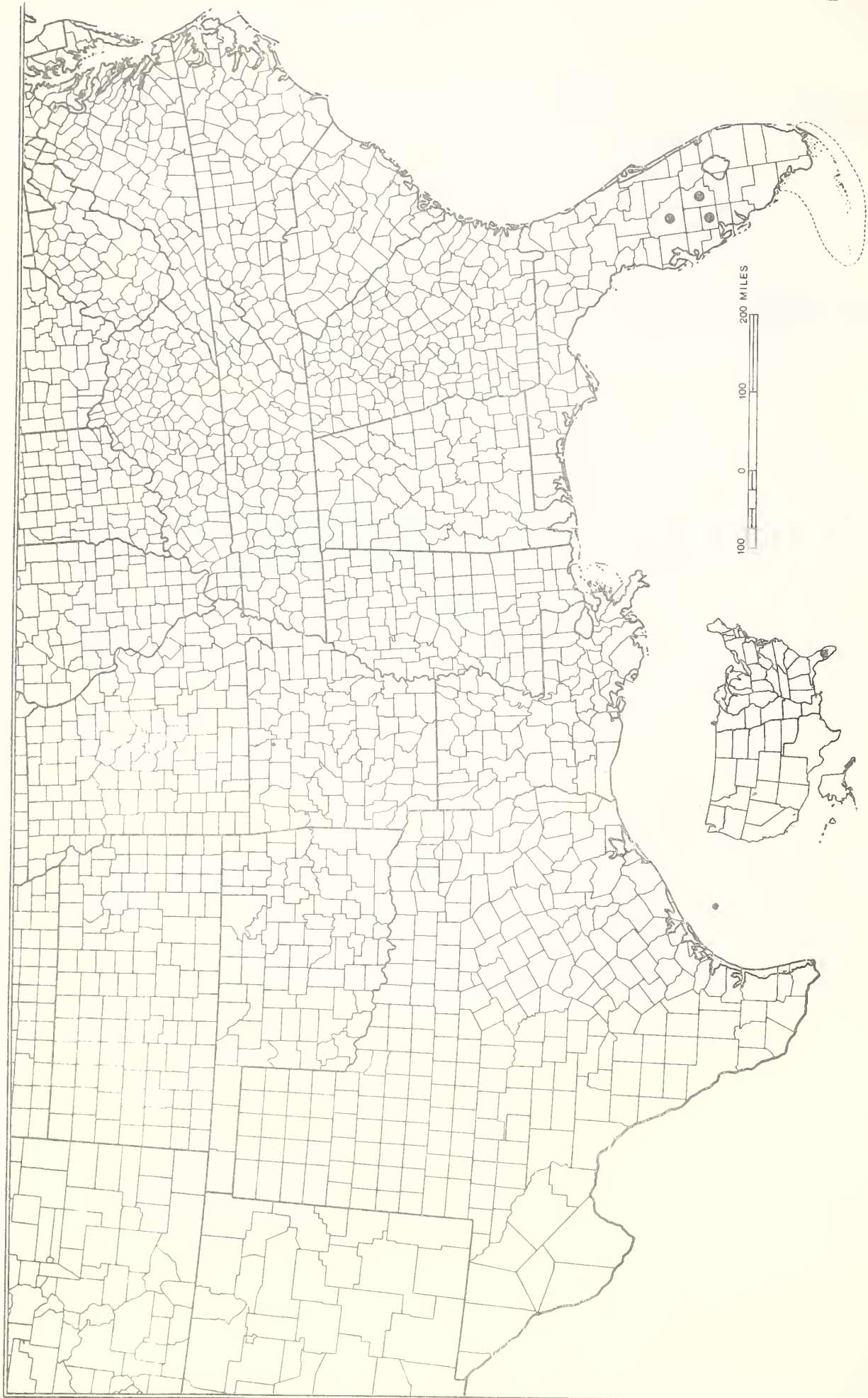
#83 Hypericum cumulicola (Small) P. Adams;  
 SPECIES: Highlands scrub hypericum

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	
Damage								
No Lasting Effect			NA					?
Beneficial if Done Properly	?	?			X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 83. *HYPERICUM CUMULICOLA*

## ASTERACEAE

Balduina atropurpurea Harper; Purple balduina

Endorima atropurpurea (Harper) Small

### Technical Description

Perennial.

Stems.--The stem erect, usually simple or sparingly branched, purplish, slightly hairy, roundish in cross section but with several low, longitudinal ridges, from a short, thick, erect rootstock with fleshy roots.

Leaves.--Alternate, narrowly spatulate, rather fleshy, numerous and evenly disposed along the stem, ascending, the largest at and toward the base, up to 12 cm long, becoming gradually shorter toward the inflorescence, short-acute, the margin entire, the base long-attenuate, sessile or short-petiolate, the surface yellowish-green, finely pitted.

Inflorescence.--Heads 1-few, usually on long, but stiffish peduncles, when fully open to 2 cm high and 5-6 cm broad.

Flowers.--Ray flowers a rich yellow, fully 3 cm long, spreading, three-to-five-toothed at the tips. Disc florets very numerous on the elevated receptacle, the corollas a deep purplish or deep reddish-brown.

Fruit.--Akenes narrowly obtriangular, finely hairy, capped by a ring of narrow, pale, thin scales.

### Distribution and Flowering Season

This showy species is found only in the Coastal Plain of northeastern Florida and in southern Georgia and blooms mostly in August and September.

### Special Identifying Features

Its nearest relative, B. uniflora, is a very similar plant with shorter leaves and a yellow disc.

### Habitats and Management Implication

B. atropurpurea grows on moist, sandy, peaty clearings among slash pine, or Tongleaf pine or a mixture of these, with an understory of palmetto, ericaceous shrubs such as blueberry, huckleberry, staggerbush, fetterbush, dwarf kalmia, shrub hypericums, and saw palmetto. It is sometimes associated with pitcher plants, lycopods, xyrids, eriocaulaceous species. Thus, it is a part of the high-hydroperiod, acidic soil complex of vegetation, and like most of these, increases with a decrease of understory shrub and overstory through fire. Selective logging or clear cutting would favor it. Mechanical removal of understory shrubby vegetation would favor its increase as would mechanical disturbance of the soil so long as the organic content were now lowered. However, drainage, so as to lower both the water content and organic content of the peaty soils it occurs in, would eliminate the species.

The species is related to the common bitterweed, Helenium amarum, and, like it, is not usually grazed unless nothing else is available. Thus, its main danger would be from drainage, a full development of coniferous overstory, or land development.

#### Suggested Reading

Harper, R. 1901. On a collection of plants made in Georgia in summer of 1900. Bull. Torr. Bot. Club 28:454-484.

Harper, R. 1904. Explorations in the Coastal Plain of Georgia during the season of 1902. Bull. Torr. Bot. Club 31:9-27.

Harper, R. 1905. Phytogeographical explorations in the Coastal Plain of Georgia in 1903. Bull. Torr. Bot. Club 32:141-171.

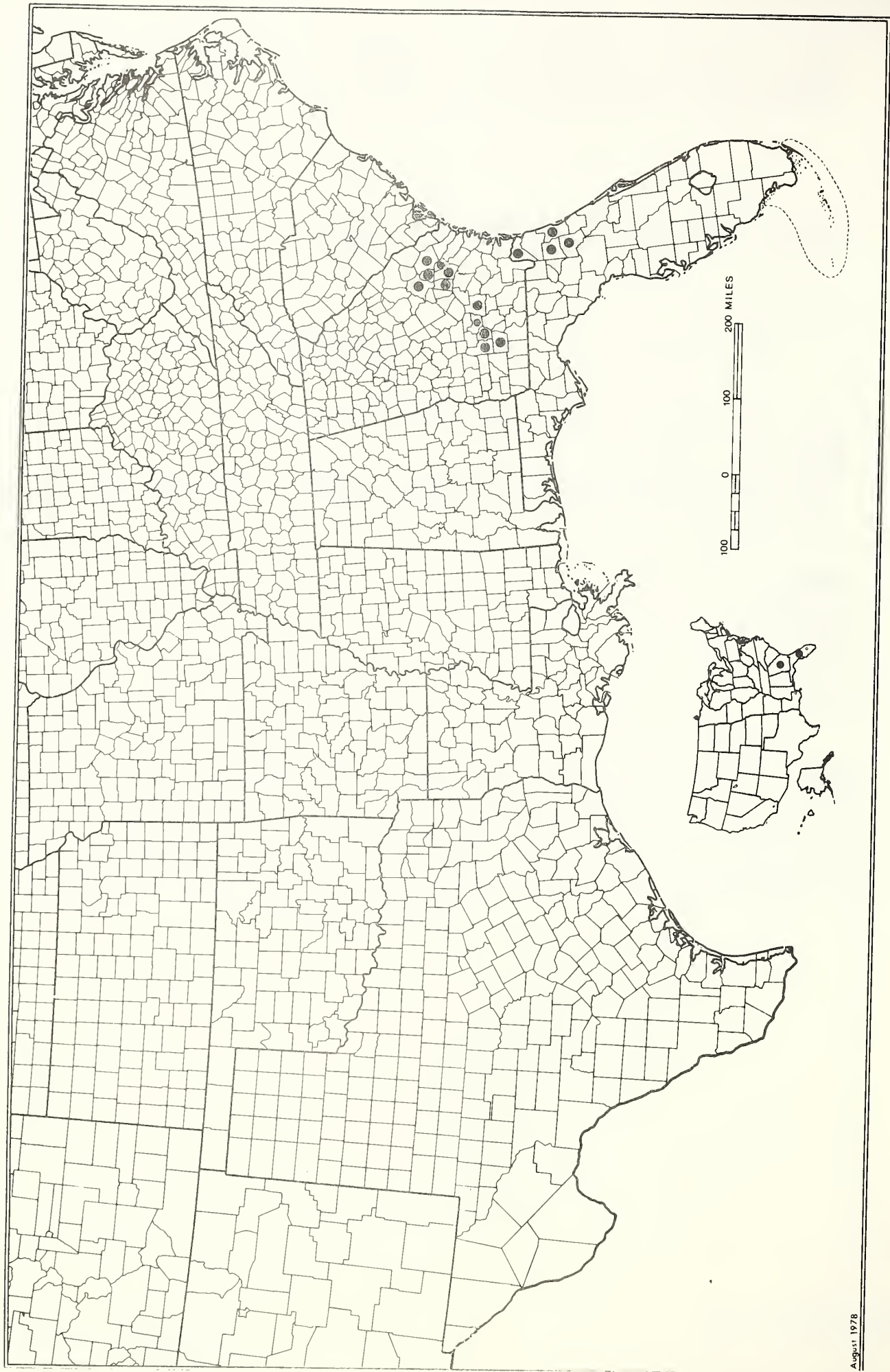
Small, J. K. 1933. Manual of the southeastern flora, pp. 1454-1455.

SPECIES: #102 Balduina atropurpurea Harper; purple balduina

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		X		X				
Damage			X					
No lasting effect								X
Beneficial if done properly	X				X	X		

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—



MAP 102. BALDUINA ATROPURPUREA

## ACANTHACEAE

Justicia cooleyi Monachino and Leonard, Cooley's water-willow

### Technical Description

Perennial, mostly 4 dm. tall or less, the stems erect from decumbent. bases, these from a slender, elongate shallow rhizome.

Stems: Shoots slender, somewhat quadrangular, spreading-hairy, somewhat zig-zag, the branches few, ascending.

Leaves: Largest toward the middle and upper stem, short-stalked, the blades ovate or lanceolate, to 5 cm. long, thinnish, spreading, the tips acuminate, the margins entire or wavy, ciliate, the bases short attenuated, the surfaces bristly-hairy.

Inflorescence: Flowering branches usually with a long basal stalk, this forking once to produce 2 spikes, the flowers several, equally distant along a zig-zag, finely glandular-hairy axis.

Flowers: Each flower with a few, linear sepal-like bracts about as long as the sepals. Sepals 4, linear, 3-4 mm. long, finely hairy, narrowly acute, erect. Petals fused, 7-8 mm. long, bilabiate, lavender, the petal tube about 4.5 mm. long, the lower lip longest, medially mottled lavender and white, 3-lobed, the upper lip short-oblong, with an erect, emarginate tip. Stamens 2, attached to corolla, the anther sacs 2 at each filament tip and of different sizes. Style elongate.

Fruit: Capsule broadly club-shaped, finely hairy, about 1.2 cm. long, flattened, the 2 valves separating to reveal a few round, flattened, dark-brown seeds.

### Distribution and Flowering Season

J. cooleyi is found in middle peninsular Florida, mostly in the Oligocene "Island" and the sparse information available indicates a flowering period from August through December.

### Habitats and Management Implication

It is found growing on the moist, well-drained sandy loams of high hammocks of the area. These are hilly, contain a large variety of southern mesic forest species such as the southern Magnolia, Black gum, Persea, Cabbage Palm, Willow Oak species, Live Oak, pignut hickory, Sweet Gum with Carpinus, Yaupon and Ostrya in the understory. Many species of ferns occupy the herbaceous understory. Most of the presently known area J. cooleyi is known from has been selectively logged over at least once, and the species persists, perhaps is even increased, by creation of less heavy shade such as would be done by the removal of some of the evergreen magnolia and oak. Some of its habitat near Brooksville has doubtlessly been destroyed by clear cutting for either agriculture or housing. This, together with the complete destruction of habitat because of mining of underlying phosphate, has probably comprised the greatest danger to the species.

To summarize, J. cooleyi is probably not much threatened by selective cutting of the hardwood overstory so long as the soil structure itself is not radically altered. Clear cutting would probably remove the species, in that it appears to be moderately shade-dependent or at least dependent upon a shade and forest-litter engendered soil type. Opening to create high-hammock pasture, a common practice in that area of Florida would, probably mostly through trampling by livestock, reduce the species. Site preparation involving soil removal and row planting or block seeding of pine, would remove the species. Thus perpetuation of J. cooleyi would have to depend on maintenance of its mesophytic overstory.

#### References

- Long, R. W. 1970. The genera of Acanthaceae in the southeastern United States. Journ. Arn. Arb. 51: 257-309.
- Monochino, J. and E. Leonard. 1959. A new species of Justicia from Florida. Rhodora 61: 183-187.
- Small, J. K. 1933. Manual of the southeastern flora, p. 1231.

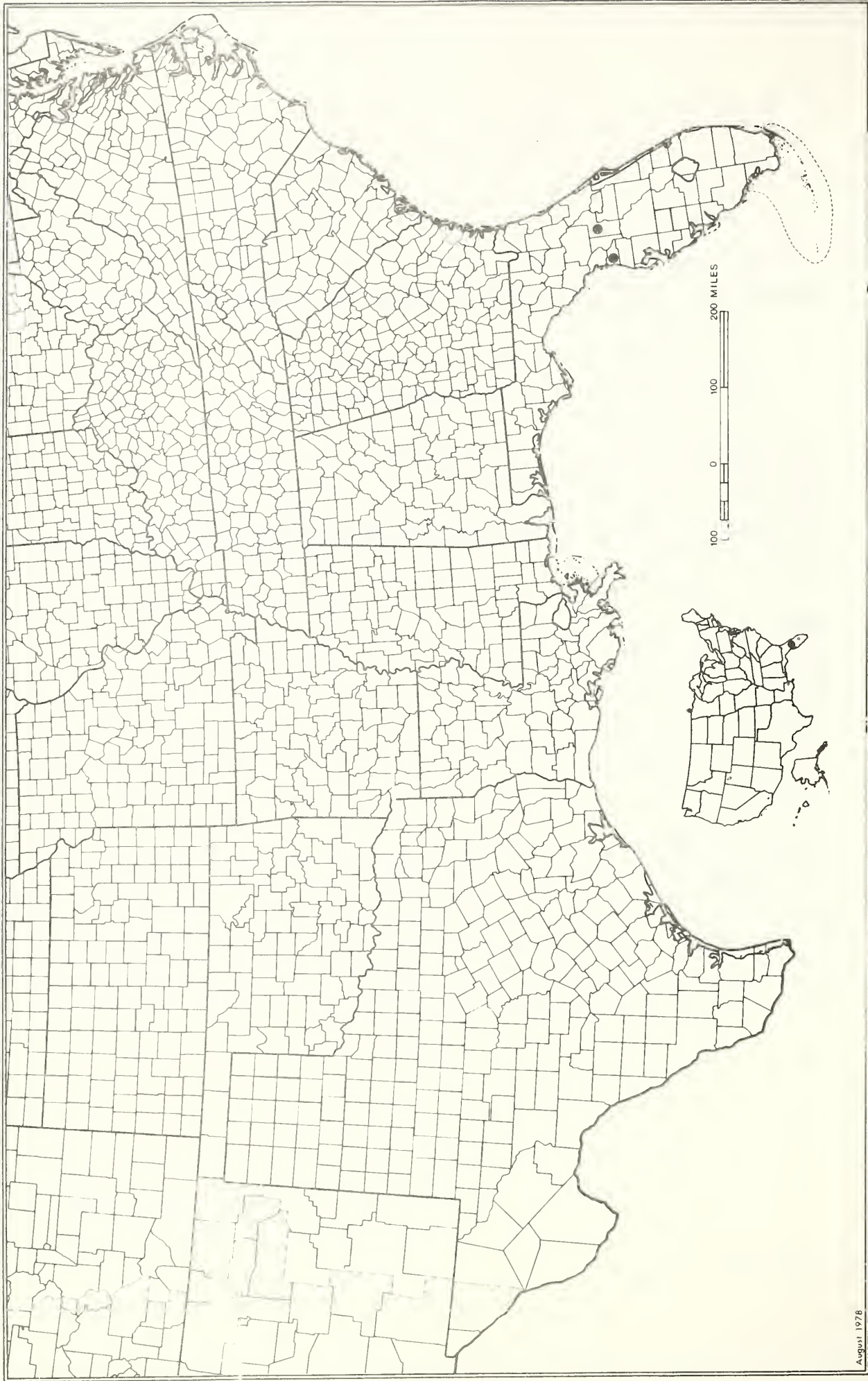
SPECIES: #106 Justicia coleyi Monachino and Leonard, Cooley's water-willow

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy	X	NA				X		
Damage								
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 106. JUSTICIA COOLEYI

ACANTHACEAE

Justicia crassifolia (Chapman) Small; Thick-leaved water-willow

Dianthera crassifolia Chapman

Technical Description

A smooth perennial.

Stems: The shoots one to several, erect, to 4 dm tall, rounded-angled or slightly winged, simple or few-branched, from a system of pale, slender but fleshy rhizomes.

Leaves: Opposite, fleshy, mostly erect or slightly spreading, the lowermost short, linear or spatulate, the largest at the middle or upper part of the stem, linear-elliptic, narrowly linear, or narrowly linear-oblan-ceolate, narrowing gradually to the tip, this narrow but blunt, margins entire, bases gradually narrowed to the short petiole, and with only the strong midrib evident.

Inflorescence: Flowers few, but showy, sessile toward the tips of long nearly erect peduncles, these from the axils of the upper stem leaves, and each with a set of short, linear bracts just beneath the sepals.

Flowers: Sepals 5, linear-lanceolate, about 1.5 cm. long, finely-serrate, erect. Corolla with petals fused, very irregular, 3-4 cm long, 2-lipped, with the lower lip longer than the corolla tube and with 3 spreading, nearly equal lobes, bright lavender with deeper purple-and-white mottlings medially, the upper lip spreading upward, shorter than the lower, oblong, the tip emarginate. Stamens 2, attached to corolla, the anthers separate toward the filament tip. Style elongated beyond the corolla tube, the stigma tip 2-lobed.

Fruit: A spatulate-shaped, flattened capsule about 7 mm long, splitting into 2, spreading valves and producing several round, blackish, flattened seeds.

Distribution and Flowering Season

This species appears to be confined largely to the wet flatwoods of northwest Florida, the gulf portion of northern peninsular Florida and to gladey wet areas in southern peninsular Florida. It blooms throughout the growing season.

Habitats and Management Implication

J. crassifolia is mainly found in the wetter areas of slash pine-saw palmetto flatwoods, usually on black sandy peats or sandy peat mucks. Its main herbaceous associates are grasses, sedges, Rhexia, Xyris, Hypericum, Drosera, Lycopodium, Ludwigia, various compositae. Its main competitors are probably grasses, sedges, together with shrubby hypericums,

hollies, various ericaceous plants that encroach upon the clearings it frequents. It appears to be part of the herb complex that is favored by heavy forest fire; this tends to create openings for such a shade-intolerant species to develop in and also reduces the shrubby understory which would tend to crowd and shade it out. Most specimens show the burnt stubs of old shoots, evidence to the fact that the plants respond vigorously and bloom well as a result of such stimulus.

Selective logging would tend to increase the species by creating openings. Clear cutting or site preparation unaccompanied by major soil disturbance would also tend to increase the species. However, in that this is a plant of high hydroperiod soils, any site preparation involving a lowering of the fluctuating, intermittently flooding water table, would eliminate the species.

#### References

Long, R.W. 1970. The genera of Acanthaceae in the southeastern US. Journ. Arn. Arb. 51: 257-309.

Small, J.K. 1918. Dianthera crassifolia. Addisonia 3: 79-80., pl. 120.

\_\_\_\_\_ 1933. Manual of the southeastern flora, p. 1231.

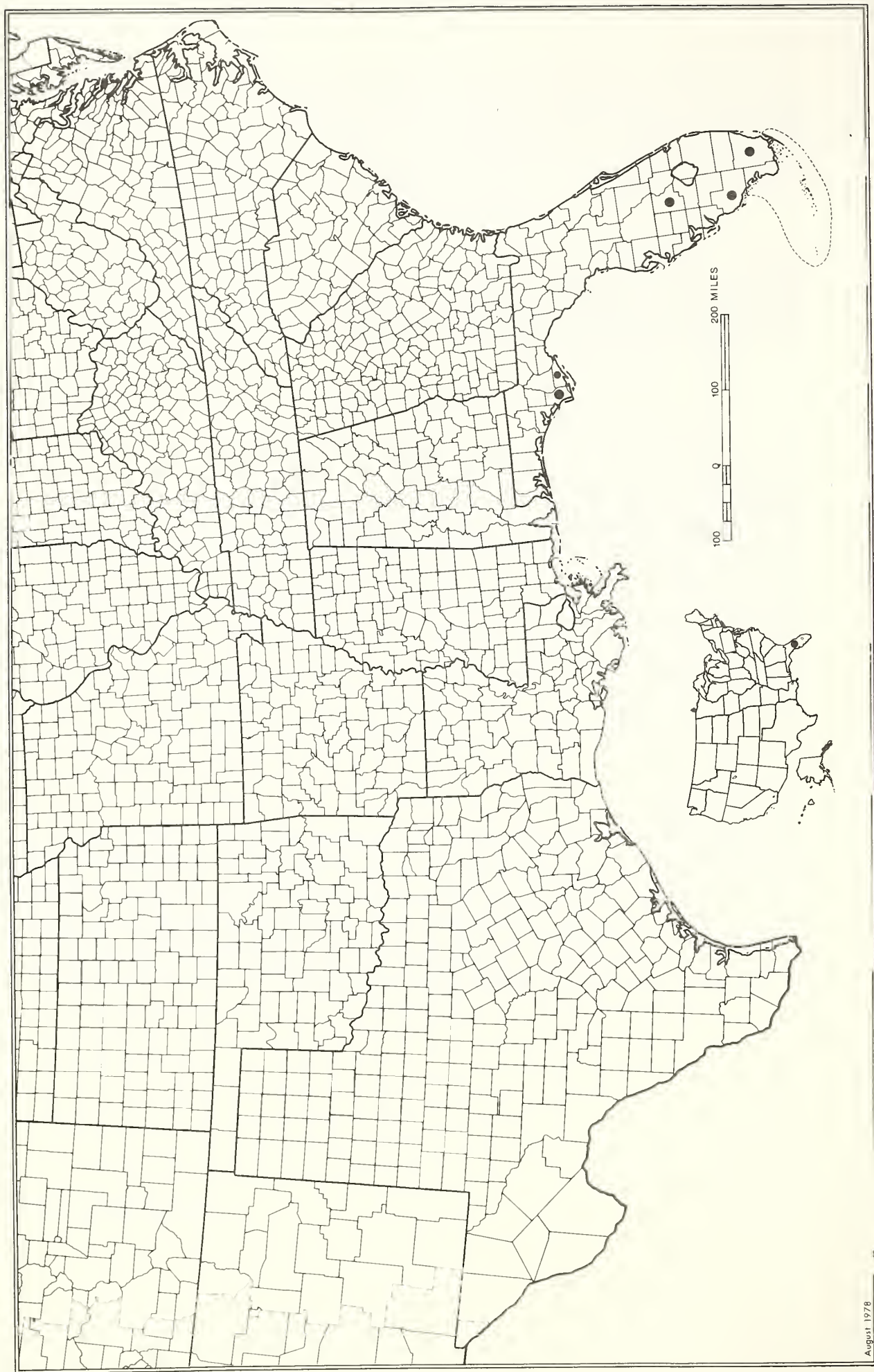
SPECIES: #107 Justicia crassifolia (Chapman) Small; Thick-leaved water-willow

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 107. JUSTICIA CRASSIFOLIA

ANNONACEAE

Asimina tetramera Small; Opposum pawpaw

Pityothamnus tetramerus Small

Technical Description

A tall pungently scented shrub or even small tree, to 3 meters tall, from a stout, deep taproot.

Stems:--Primary stems 1-several, these erect or arching, smoothish, the bark reddish-brown or grayish with raised small lenticels, that of new shoots sometimes with small reddish hairs.

Leaves:--Alternate, lacking stipules, mostly oblong or oblanceolate, spreading wide and slightly upward on the shoots to form a "V", between 5 and 10 cm long, the tips broadly acute to blunt, the margins slightly rolled-inward to the midrib beneath, the bases usually acute to short stalks. The upper leaf surface deep green, somewhat lustrous; the lower leaf surface paler, raised-veiny.

Inflorescence:--The regular flowers produced singly or in 2's from all upper leaf axils of a fresh shoot on nodding peduncles to 2 cm long; maroon, fetid-smelling, about 3 cm broad.

Flowers:--Sepals 4, rarely 3, triangular, greenish with lines of short, reddish hairs, shorter than the outer petals. Petals 6, in 2 sets of 3 each, with the outer longest, pale maroon, oblong, blunt, slightly spreading, inrolled; the inner 3 petals are ovate, cup-like at the base. Stamens numerous, arranged in a tight greenish ball on the receptacle. Carpels (pistils, ovaries) several, borne at the tip of the receptacle (torus).

Fruit:--The receptacle swells after fertilization to become a largish ball on which 3-5 or more big, greenish-yellow, peanut-hull-shaped berries develop, these up to 9 cm long, and with edible flesh. The seeds are the size and shape of a kidney bean, with the coat a dark, lustrous brown.

Distribution and Flowering Season

This rare shrub is infrequent in sandscrub in southeastern peninsular Florida from Martin Co., south into Palm Beach County. It blooms from May through August or all during the growing season.

Habitats and Management Implication

A. tetramera, which in flower strongly resembles the northern pawpaw, is a shrub of deep, rather fine-textured sands, mostly old dunes inland from the present coast. It is usually in open stands of Sand Pine, scattered amongst understory plants such as Sabal, Serenoa, Ceratiola, Lyonia, scrub Quercus, Carya, and other shrubby Asimina. It responds favorably to fire, rapidly producing numerous new shoots from its thick, long taproot. It responds favorably to cutting back as well, so that burning or mechanical

damage actually promote flowering and fruiting in that flowers do not develop well on old bushes. Discing if not accompanied by wholesale raking and windrowing of all vegetation would probably promote its growth, in that the rootstocks can be cut up and each piece produce new growth. The principal threat faced by this species is the wholesale subdivision and land development for retirement and other housing that is occurring in the area. Clear-cutting and surface removal of understory to reveal the almost pure sandy soils would increase the species, which spreads naturally into such clearings. The seeds are doubtless buried by some mammals or by gopher turtles; exact information about dissemination is not available. The species is intolerant of heavy shade, does best in clearings or open stands. Crown closure of pine overstory would suppress, ultimately eliminate, the species. Another natural competitor are the palmettos which likewise abound in these situations but which are less likely to be shaded out by the pine.

#### References

- Kral, R. 1960. A revision of Asimina and Deeringothamnus (Annonaceae).  
Brittonia 12 (4): 233-278.
- Small, J. K. 1926. A new pawpaw from Florida. Torreya 26: 56.
- \_\_\_\_\_. 1933. Manual of the southeastern Flora, pp. 530-531.

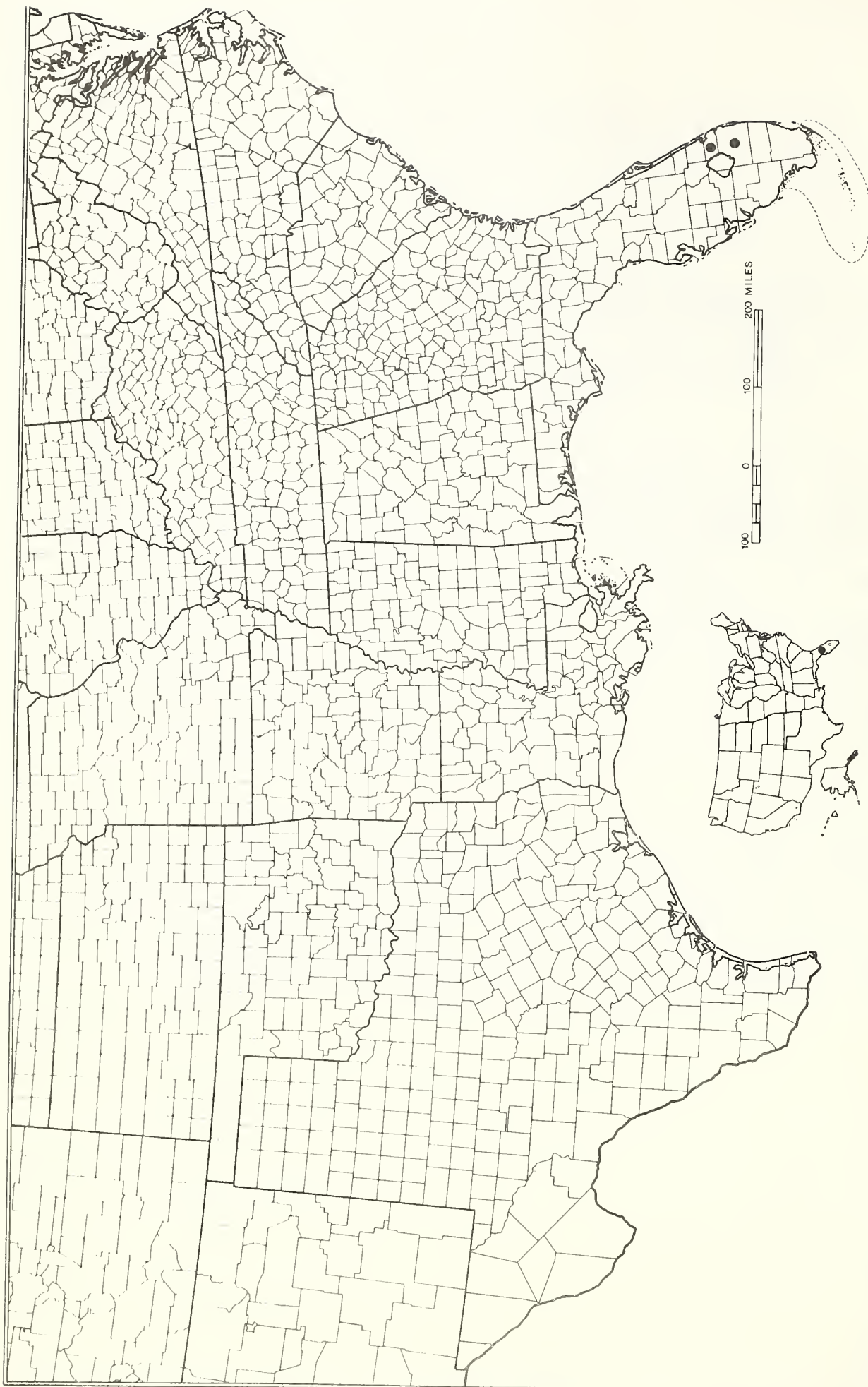
SPECIES: #108 Asimina tetramera Small; Opposum pawpaw

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect		X	NA	X				X
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 108. ASIMINA TETRAMERA

APIACEAE

Oxypolis greenmanii Mathais & Constance; Giant water cowbane

Technical Description

Tall (to 3 meters), smooth, perennial herb from a cluster of tuberous or thickish roots.

Stems: Usually single, rigidly erect, tubular, often 1.5 cm thick, usually sparingly branched.

Leaves: Lowest leaves linear-tubular, often to 5 dm long, strongly cross-walled as in some rushes, tapering gradually to narrowly conical tips. Leaves gradually shortening, widely scattered on the stem as the flower clusters are approached.

Inflorescence: Flowers greenish-yellow or maroon-tinted, about 3 mm broad, in terminal compound umbels up to 1 dm broad. Involucre of greenish, linear bracts mostly shorter than the flower stalks.

Flowers: Sepals very small, triangular, spreading. Petals greenish or maroon-tinted, broad, incurved.

Fruits: Strongly flattened, with broad, pale wings, about 7 mm long.

Distribution and Flowering Season

O. greenmanii is confined to a few counties of northwestern Florida in the Apalachicola River watershed, and blooms during July and August.

Special Identifying Features

This species is quite distinctive, with its very rush-like appearance. Its nearest relative, O. filiformis, has whitish flowers and is a lower plant.

Habitats and Management Implication

It is a species of high hydroperiod soils, is very often rooted in sandy peat or peat-muck of margins of cypress-pond pine-Nyssa "ponds" or in shallow water of the ponds themselves or ditches or watercourses. Its commonest shrubby associates are various species of Hypericum, Stillingia aquatica.

The forest type surrounding such hypericum ponds is usually a mixture of slash pine and longleaf pine with palmetto-gallberry understory, with interspersions of ti-ti. The underlying substratum is often a deep, black, sandy peat muck.

Logging of the pines and cypress of the areas this frequents would tend to increase the species. Succession to a swamp-hardwood overstory would shade it out it is definitely a plant of clearings in wetlands. Site preparation involving drainage would eliminate the species.

## References

Mathias, M.E. and L. Constance 1942. New North American Umbelliferae.  
Bull. Torr. Bot. Club. 69: 151-155.

Revised March 1980

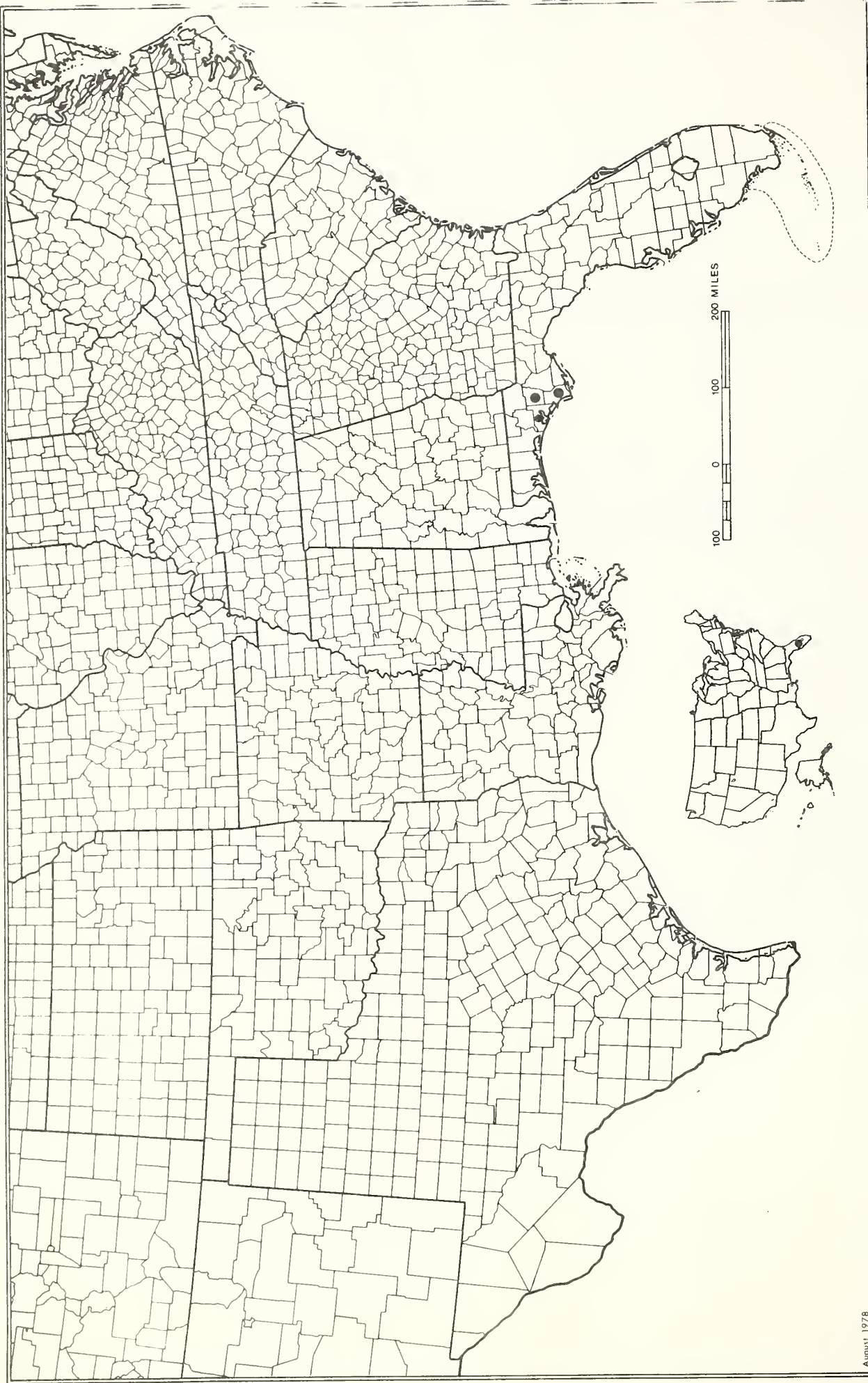
SPECIES: #112 Oxypolis greenmanii Mathais & Constance; Giant water cowbane

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		NA					NA	
Damage								
No Lasting Effect								?
Beneficial if Done Properly	X							

Other Comments: No draining - a true swamp plant

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

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MAP 112. OXYPOLIS GREENMANII

ARISTOLOCHIACEAE

Hexastylis speciosa Harper; Harper's heartleaf

Technical Description

Perennial, gingery, rhizomatous, smooth evergreen herbs, the plants in large or small tufts, with few to several short, shallow, aromatic, ovate-scaley rhizomes extending out from the centre.

Leaves: Each rhizome short, bearing but 1 leaf at its apex, this on an erect or ascending, slender, round petiole longer than the blade; blade ovate or triangular, leathery, to 12 cm long, the apex acute, the margin entire, the base either deeply cordate or hastate, a deep, lustrous green with paler mottlings.

Inflorescence: Flower solitary in the leaf axil, unpleasant-smelling, about 3 cm high and 3-4 cm broad on an elongate peduncle but still lower than the leaves.

Flower: Calyx members 3, fused into a bell-shaped, tubular base, this expanded abruptly above into a short-cylindrical flange, this in turn flaring into 3 short-triangular, blunt calyx lobes; calyx surface externally pale tan with copious, maroon flecks, internally in the throat and lobes with broad maroon bands alternating with narrow, pale tan longitudinal bands. Stamens and ovaries fused into a short cylindrical mass, the stamens 12 in a fused ring (actually of 2 whorls), the filaments short and fleshy, the anthers lateral, lower than the connective tips; styles 6, erect, their tips projecting above the stigmas, ovary compound, superior.

Fruit: Fleshy, berry-like, many-seeded, surrounded by the tissue of the calyx, about 1 cm. long.

Distribution and Flowering Season

This wild-ginger is perhaps the rarest in the genus, so far being found only in the inner Coastal Plain of Alabama in 2 counties where it blooms in May and June.

Habitats and Management Implication

H. speciosa is definitely a plant of full or partial shade where it is found rooted in sandy-silt-loam of slight ravine slopes along streams on moist, never wet, substrates. The overstory is usually mixed hardwoods such as black gum, sweet gum, willow oak species, elms, hickories, with a scattering of loblolly and spruce pine; occasionally the Hexastylis works its way up into ravine heads forested with longleaf pine-oak-hickory. Associated herbaceous species are those typical of mesophytic woodlands, and never dense. Understory shrubs are usually low and highbush blueberries, azalea, Sebastiania. Japanese vine honeysuckle is invading these localities and, together with Kudzu, ultimately will drown out both the original herbaceous and shrubby understory. Soil reaction is slightly to quite acidic.

This Hexastylis is, like all other U.S. native species of its genus, intolerant of full sunlight. Selective logging of the overstory would effect it little; clear cutting would eliminate it in a few years even if the soil were relatively undisturbed. Clear cutting accompanied by mechanical site preparation would even more speedily destroy the species, probably through the multiple factors of increased insolation, reduction of the organic content of the soil, and increasing of the 24 hour soil temperature regimen.

#### References

- Blomquist, H.L. 1957. A revision of Hexastylis of North America. *Brittonia* 8 (4): 255-281.
- Harper, R.M. 1924. A new heartleaf and other interesting plants from Autauga Co., Alabama. *Torreya* 24: 77-83.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1279-1280.

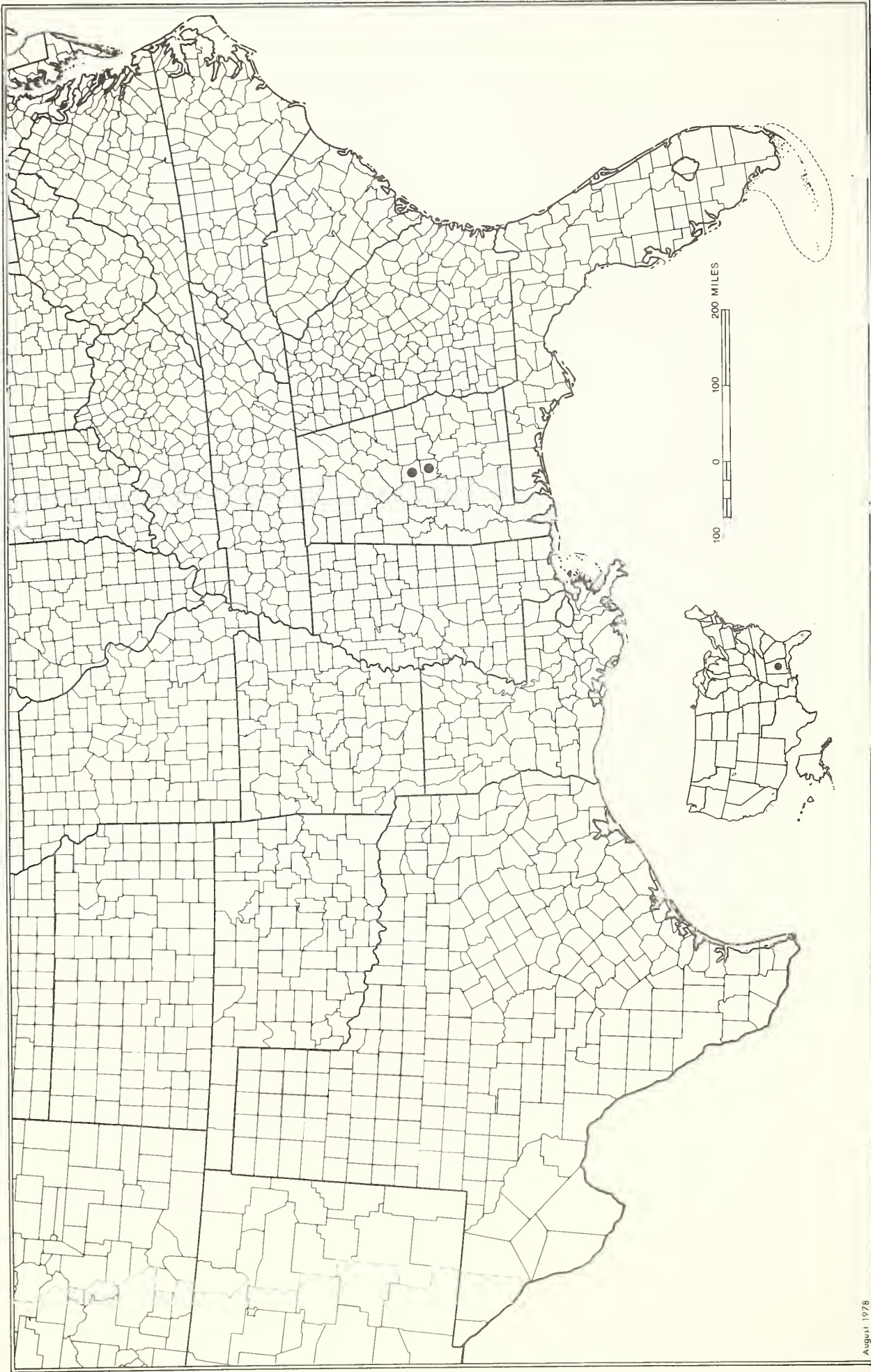
SPECIES: #116 Hexastylis speciosa Harper; Harper's heartleaf

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X		
Damage								
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



August 1978

MAP 116. *HEXASTYLIS SPECIOSA*

ASTERACEAE

Aster pinifolius E. J. Alexander; Pale-violet aster

Technical Description

Perennial, the plants mostly 6-10 dm tall, forming clones by inter-connecting, slender, horizontal rhizomes and slender, pale, whip-like stolons.

Stems.--Slender, wand-like, erect, sparingly branched or simple, mostly smooth, reddish brown basally, upwardly becoming greenish, with low wing-angles and shallow pilosulous grooves.

Leaves.-- Alternate, the lowest gone by flowering time, the largest lowest, mostly linear or elliptic-linear, or narrowly spatulate, mostly 2-3 cm long, acute and with short, fleshy mucros, the margins entire or sparingly low-ascending-toothed, the base sessile.

Inflorescence.--Heads few to many, usually terminating subulate-leafy, ascending laterals (the lowest sometimes with a few elongate, subulate-leafy branches), turbinate, in bloom about 6 mm high, 6 mm across phyllary tips, with uppermost bracts short-linear or subulate and grading into the several, loosely imbricate phyllaries. Phyllaries mostly erect, linear, the inner longest, about 5 mm long with firm, pale, short-excurved bases, acute and short-subulate (often purplish) tips, the margins thin (scarious), sparingly ciliate, the surfaces smooth, the backs with a single impressed mid-nerve, this area with a green median zone and bordered by the pale broad margin.

Flowers.--Ray florets 25-30, the ligules spreading, blue-violet, narrowly linear, about 5 mm long. Disc florets with corollas purplish or rose with triangular lobes about 0.6 mm long.

Fruit.--Akenes short-cylindric, ribbed, pale brown, about 1.5 mm long, short-hairy; pappus yellowish-white, capillary, with fine, upward-pointed barbels.

Distribution and Flowering Season

Wet, open, calcareous places in pine barrens or sandy peaty shores of lime-sink ponds and lakes, southern peninsular Florida, northwestern Florida and southeastern Alabama. Flowering in October, November.

Special Identifying Features.

The distinctness of this aster as a species is doubted by Dr. Cronquist (personal communication) who treats it as a part of the widespread Aster dumosus.

Habitats and Mangement Implication

My own experience with it is in the karst country of southeastern Alabama, and from specimens so identified from similar country in northwestern Florida where it is locally abundant on the shores of limesink ponds and lakes set in the rolling longleaf pine-turkey oak hills. Usually

these same have their intermittent, fluctuating shores bordered by grass-sedge, interspersed with various tall-shrubby Hypericum species. It is in this zone that the Aster grows, often with its bases submersed in shallow water and its roots in wet or at least moist, sandy peat. Upward from this zone is another, usually dryish, zone of Quercus virginiana which is interspersed with longleaf pine or grading into same.

The pine of these areas has been managed variously, the oaks usually left alone. The only problem with impaction of the aster habitat would be any logging combined with draining of the adjacent wetlands where the aster grows or a plowing or bulldozing of this same area. Drainage would of course eliminate this species of high hydroperiod soils. Pasturage of the area destroys plants through trampling.

#### Suggested Reading

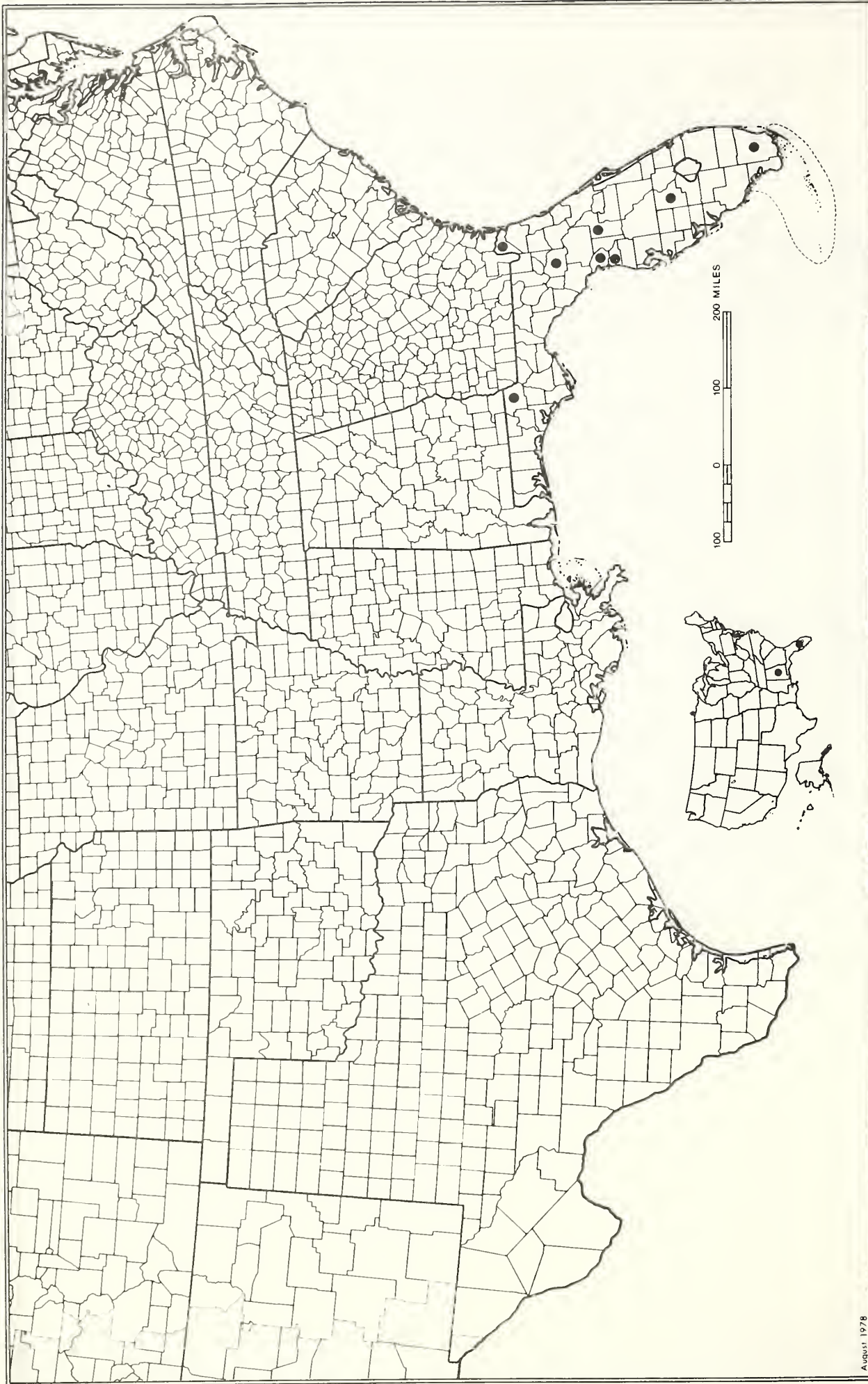
Small, J. K. 1933. Manual of the southeastern flora, pp.1364-1394.

SPECIES: #117 Aster pinifolius E. J. Alexander; Pale-violet aster

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		NA					X	X
Damage								
No lasting effect	NA							
Beneficial if done properly								

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.---



MAP 117. *ASTER PINIFOLIUS*

ASTERACEAE

Echinacea tennesseensis (Beadle) Small;  
Tennessee purple cone-flower

Brauneria tennesseensis Beadle

Technical Description

Perennial, the several erect shoots arising from a short, thick, branched underground, erect or spreading rhizome.

Stems: Greenish or purplish tinted, roundish in cross section but longitudinally low-ridged, spreading-rough-hairy.

Leaves: Both in a rosette and scattered up the stem, there alternate, rough-hairy: Rosette leaves long-petioled, to 2.5 or 3.0 dm long, the blades mostly linear-elliptic or linear-lanceolate, triple-nerved, these grading into progressively shorter, short-petioled, then sessile, linear stem leaves, these further reduced on, then absent from, the elongated peduncle.

Inflorescence: Heads solitary at tips of shoots on long, stiff, leafless peduncles, fully 7 cm broad in full bloom and 2.5-3.0 cm high.

Involucre with 2-3 series of green, white-ciliate, linear bracts; surface of receptacle elevated, conic, producing with each flower a deep brown or orangish bristly bract (chaff) giving the heads in bloom or fruit a prickly appearance.

Flowers: Rays 8-10, the ray corollas spreading horizontally, linear-oblong, 2.5-3.0 cm long, apically narrowly toothed, a rich bright purple. Disc flowers purplish-tinted, the corolla lobes usually erect, triangular.

Fruit: Akenes short oblong-triangular, angulate, gray-brown, the pappus a thin but firm, irregularly toothed crown atop the akene.

Distribution and Flowering Season

E. tennesseensis appears to be confined to a few localities in the counties of Davidson, Rutherford and Wilson, in the Central Basin of Tennessee. It blooms from late June through July, and intermittently through to October, depending on rainfall.

Habitats and Management Implication

This species is always found on the thin soil over horizontally bedded limestone of Ordovician age, usually in clearings or in open stands of Juniperus virginiana. It is a part of that complex of species known to inhabit what are called "open" limestone glades. It is commonly associated with such species as Petalostemon gattingeri, Astragalus tennesseensis, Satureja glabella, Bléphilía ciliata, Asclepias viridiflora, A. virescens, A. tuberosa, Opuntia, Talinum calcaricum, annual and various grasses such as Sporobolus, etc. This sort of soil is wet during the winter and early spring, then becoming

a sticky saturated clay, but during late spring and through summer drying to become almost bricklike in hardness.

The species appears to be part of the perennial forb stage of plant succession in the Central Basin that ultimately prepares the site for Juniperus virginiana, which gives way to a climax of oak-hickory or mixed-mesophytic forest. Here and there populations of this Echinacea may be seen where juniper seedlings are interspersed or young junipers of sapling size are shading them, or may even be seen in open stands of Juniperus. However, this cone flower as is true of all others, is intolerant of real shade, hence is winnowed out eventually as the community changes to forest.

In light of the above it may be stated that E. tennesseensis may be increased by clearing away of the forest or by any forest treatment that did not involve removal of the thin layer of soil overlying the limestone bedrock. The knotty strong rhizome enables this species to resist fires such as frequently ignite the dry vegetation of open and closed cedar glades in summer.

The major threat to the species at present lies in the conversion of much of what were large tracts of cedar glade to private and public housing developments. This in fact led to the destruction of the type locality at Luvergne, Tennessee. Similarly, because of construction of the Corps of Engineers dam of the Stones River, flooding of the reservoir has further reduced the known area of the species.

#### References

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McGregor, R. L. 1968. The taxonomy of the genus Echinacea (Compositae). Univ. Kans. Sci. Bull. XLVIII (4): 113-142.

Quarterman, E. and T. Hemerly. 1971. Rediscovery of Echinacea tennesseensis (Beadle) Small. Rhodora 73: 304-305.

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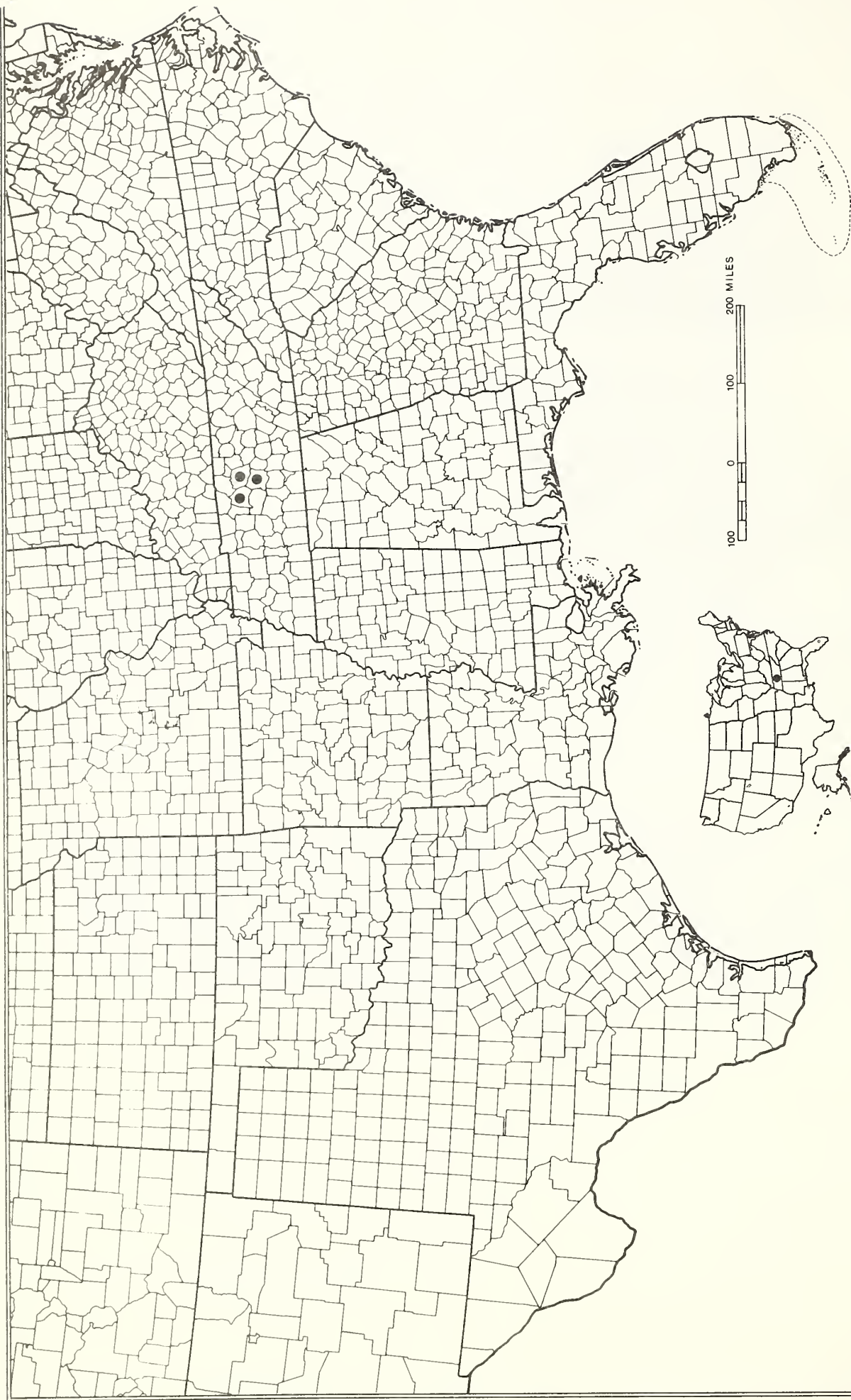
SPECIES: #119 Echinacea tennesseensis (Beadle) Small; Tennessee Purple  
cone-flower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect								X
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 119. *ECHINACEA TENNESSEENSIS*

ASTERACEAE

Jamesianthus alabamensis S. F. Blake & E. E. Sherff, Alabama jamesthianus

Technical Description

Perennial, from rhizomes, smoothish except for reddish gland-tipped hairs on the flower-cluster branches.

Stems: Stems up to 1.5 meters long, erect or spreading and sprawling on other plants.

Leaves: Leaves opposite, erect or spreading, up to 9 cm long, mostly oblanceolate, slender-and-sharp-tipped, entire or low-toothed, the bases rounded or cordate, the stalks short.

Inflorescence: Heads several, borne toward tips of elongate, slightly spreading branches, similar to some Beggar-ticks (Bidens) with ray flowers spreading, canary yellow, the head in full bloom about 3 cm broad. Bracts of head overlapping, thin, green; receptacle of the head cone-shaped, lacking chaff.

Flowers: Disc flowers yellow. Ray and disc flowers both fertile, producing akenes 3-4 mm long, these oblong-linear in outline, gray brown. Only disc fruit producing pappus, this of about 5, slender, deciduous, brownish bristles.

Distribution and Flowering Season

This plant is known to occur naturally in parts of two counties in northwestern Alabama, always on the banks of small streams tributaries to the Tennessee River system. It blooms in late summer and fall.

Habitats and Management Implication

The habitat is always wet, the plants occurring on wet gravelly or silty sands in places where the streams cut through shale or limestone. Usually Jamesianthus is in full sun or part shade, associated with such plants as Plantago cordata, Justicia americana, Rudbeckia fulgida var. umbrosa, Leersia, and such woody species as Alnus, Salix, together with Ulmus, Quercus of the red and white groups, Nyssa, Liquidambar and Populus. The forest of the drained banks and bluffs is typically mixed mesophytic.

This plant is rare even within its small range. It has been observed only in relatively undisturbed situations. In that it is a plant of sun, some logging of the hardwood forest of its habitat would probably not affect it adversely. Mechanical disturbance of heavy timbering of the slopes above the streams would probably affect it adversely through deposits of consequent slope erosion, through lowering of the water table or through flooding. Much of the land the species occupies is

being converted to beef cattle range, so that the trampling and grazing of creekbank vegetation by cattle could pose the greatest threat to existence of this species. Channelization projects also pose a threat.

#### References

Sherff, E. E. 1940. A new genus of the Compositae from northwestern western Alabama. Publ. Field Mus. of Nat. History, Botanical Ser. 22:399-403. 22:

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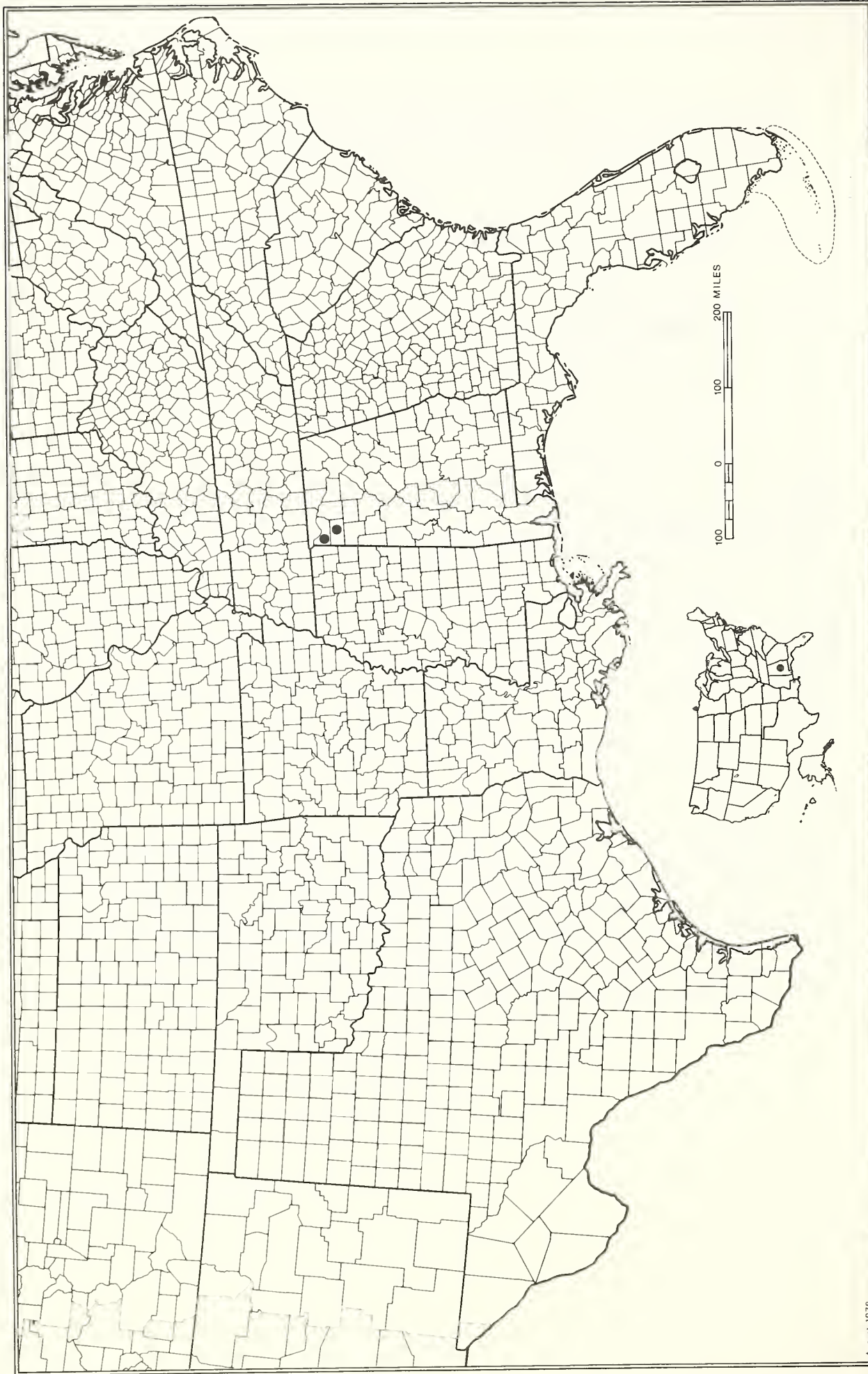
SPECIES: #121 Jamesianthus alabamensis S. F. Blake & E. E. Sherff, Alabama  
jamesthianus

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage						X		X
No Lasting Effect				NA				
Beneficial if Done Properly					X			

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 121. JAMESIANTHUS ALABAMENSIS

ASTERACEAE

Liatris ohlingerae (Blake) Robinson; Florida gay-feather

Ammopursus ohlingeri (Blake) Small

Technical Description

An erect perennial, usually unbranched, from a stout, thick-segmented deepset rootstock.

Stems: To 1 meter, in cross section round, with a pale dusting of short, appressed, crisped hairs.

Leaves: Numerous, spirally arranged, the lowest gone by flowering time, the lowermost longest, spreading, linear, mostly 4-7 cm long, acute - tipped, entire, the bases attenuated to a short petiole, 1-ribbed, the surfaces smooth but pitted, with glands in the pits. Lower leaves grading gradually up the stem into short bracts.

Inflorescence: Heads several but rather distant, usually 1 terminating each stiffish, elongate, spreading-ascending peduncle, cylindric- campanulate, from base to pappus tips 2-3 cm long and to 2 cm broad; bracts of head erect, numerous in several spirally imbricate series, oblong, obtuse or narrowly rounded, the margins finely ciliate, the backs glandular-pitted and sometimes also with a few pale, appressed short hairs.

Flowers: All discoid, the corollas a bright purple, the tubular throats expanding into 5, spreading-triangular lobes; styles elongate, projecting beyond the corolla, bright purple.

Fruit: Akenes oblong, spindle-shaped, 8-10 mm long, many-ribbed, short - haired, capped by a pappus of fine, white bristles (these finely barbed).

Distribution and Flowering Season

This species is found in the southern part of the Central Highlands of peninsular Florida, in what is called the Lake region. It blooms from July through September and October.

Habitats and Management Implication

L. ohlingeri is always found on the deep, fine-textured white sands of sandhills, usually in open stands of or clearings in the sand pine - evergreen scrub oak type. Therefore its overstory associates are rather consistent. Its shrubby associates are various ericads such as Lyonia, other composites such as Garberia, and various Hypericums, Ilex, Ceratiola, Polygonella, etc.

The species is invariably found in undisturbed scrub vegetation, but is probably maintained naturally through woods fires clearing away competing (and shading) overstory and shrub vegetation. Deep mechanical

disturbance of the soil appears to reduce it. Cutting of the sand pine, if accompanied by removal of competing shrubby growth, would tend to increase it. Its primary hazard today consists of land development with promotion either of citrus groves or real estate.

#### References

Blake, S. F. 1923. Two new composites from Florida  
Bull. Torr. Bot. Club 50:203-205

Gaiser, L. O. 1946. The genus Liatris, Rhodora 48: 331-382.

Robinson, B. L. 1934. Records preliminary to the general Treatment of the Eupatorieae XI. Contribs. Gray Herb. 104:3-49

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Bull. Torr. Bot. Club 51:379-393.

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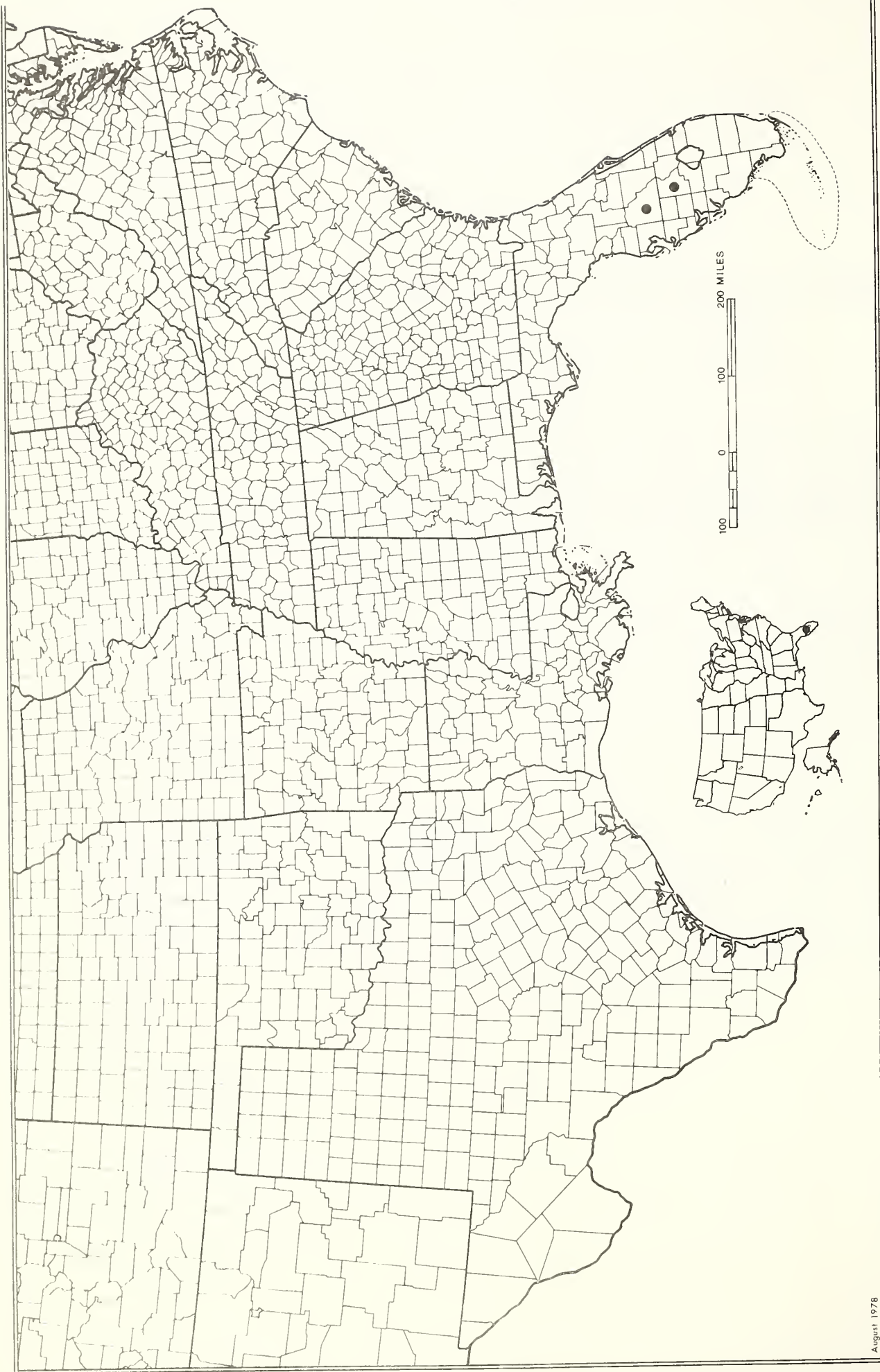
SPECIES: #122 Liatris ohlingerae (Blake) Robinson; Florida gay-feather

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	
Damage		X	NA					
No Lasting Effect								
Beneficial if Done Properly	(NA) X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 122. LIATRIS OHLINGERAE

ASTERACEAE

Liatris provincialis Godfrey; Godfrey's gay-feather

Technical Description

Erect, simple or sparingly branched perennial herb from a round, tuberous rootstock.

Stems: To 8 dm tall, round in cross-section, longitudinally low-ridged, copiously short-pale-hairy.

Leaves: Mostly linear, the longest at stem base to 20 cm long, long-petiolate, linear-elliptic, acute, entire-margined, and sparingly long-ciliate, attenuate-based, these grading abruptly to much shorter stem leaves that are sessile, linear, narrowly sharp-tipped, then gradually shorter into the inflorescence: leaf surfaces dotted with glands and with 1, strong midrib, this raised beneath.

Inflorescence: Heads many, spreading, cylindric, in a long-cylindric inflorescence, sessile or short-stalked, from base to pappus tip 1.0-1.5 cm long, to 0.5 cm broad, mostly cylindrical, the bracts rather few, linear-lanceolate, in several spirally overlapping series, oblong, purplish, the tips acute, with a short, slightly spreading cusp, the margins ciliate toward the tip, and with a pale purplish-rose border, the backs gland-pitted, sometimes with a few short hairs.

Flowers: Heads with disc flowers only, these with bright lavender-rose or purplish corollas, these producing spreading, triangular lobes from which project narrow style branches of the same color.

Fruit: Akenes narrowly conic-cylindric, short-hairy, about 5 mm long, the pappus much longer, white, of slender, capillary, short-barbed bristles.

Distribution and Flowering Season

L. provincialis is confined to a few counties of northwestern Florida (Franklin, Wakulla) and blooms mostly in September and October.

Special Identifying Features

It is superficially closest to another Blazing star, L. chapmanii, but can easily be told in the field in that the latter has the heads more or less erect, whilst these are more spreading. Also, the foliage of L. provincialis is smoother, the leaf surfaces often being glabrous or nearly so.

Habitats and Management Implication

L. provincialis grows in sandy clearings in longleaf pine-turkey oak scrub or in the sand-pine, Ceratiola, evergreen scrub oak type. It is shade intolerant, hence is probably maintained naturally

through fire removing competing shrub and overstory. Its commonest herbaceous associates during the flowering period are various goldenrods, golden-asters, pinweeds, jointweeds such as Polygonella, etc., all species of deep, dryish sands.

The sort of clearings provided by removal through clear cutting of the pine and mechanical removal of the oaks and scrub tend to favor development of this species which seeds abundantly into the cleared areas. Deep mechanical disturbance of the sandy substrate appears to increase the species and drainage of contiguous high hydroperiod areas near the coast would provide area for it to occupy, if this be accompanied by clearing. The major hazard the species faces is therefore land development for real estate, or by establishment of a total pine overstory (which would shade it out). Block cutting of the sand pine or longleaf pine so as to have areas provided for seed to reach, would probably favor this species.

#### References

Godfrey, R. K. 1961. American Midland Naturalist 2: 466-470.

Revised March 1980

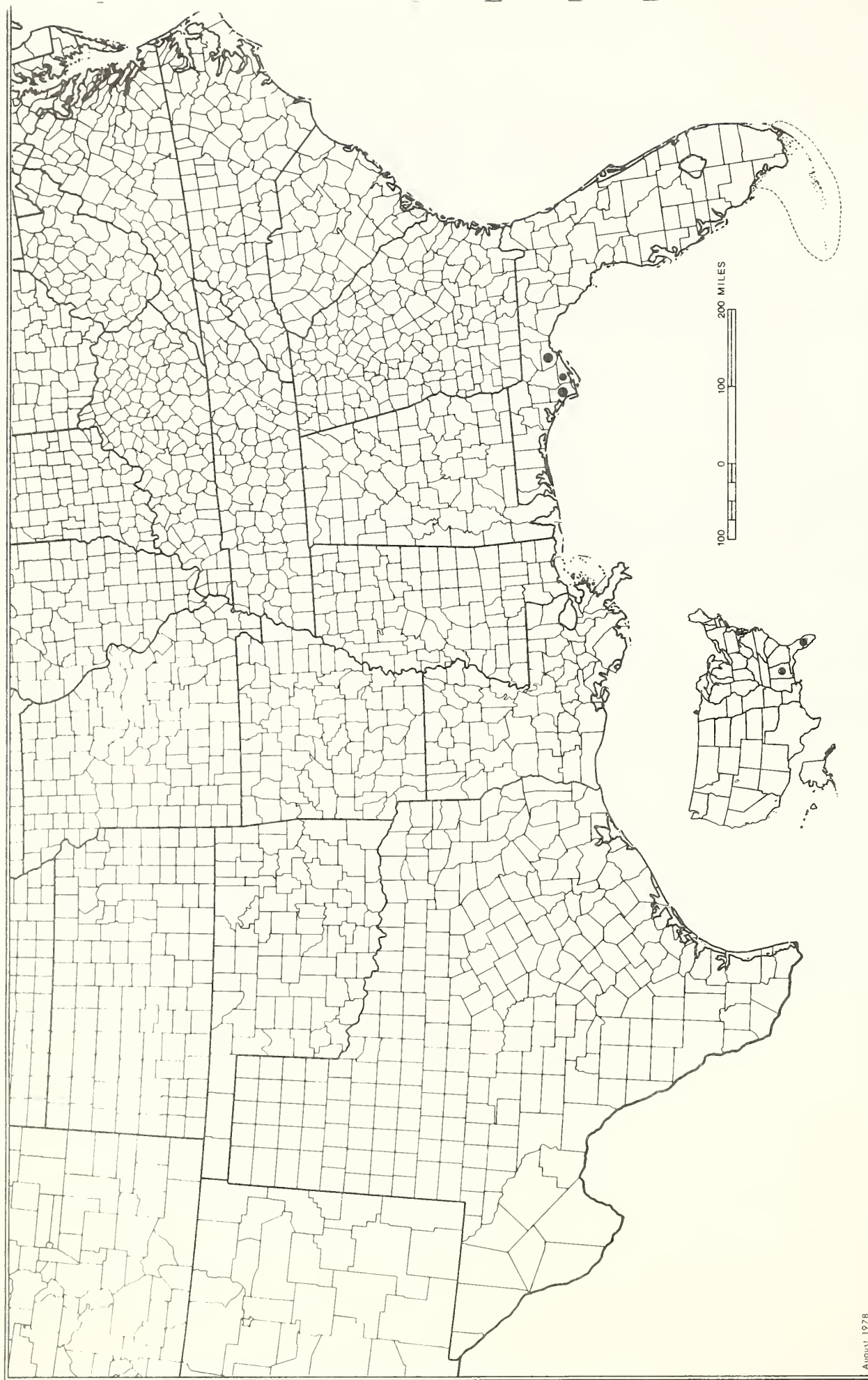
SPECIES: #123 Liatris provincialis Godfrey; Godfrey's gay-feather

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage			NA					
No Lasting Effect		X		X				
Beneficial if Done Properly	(NA) X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 123. *LIATRIS PROVINCIALIS*

## ASTERACEAE

Marshallia mohrii Beadle and Boynton; Mohr's barbara's-buttons

### Technical Description

Erect, perennial to 7 dm tall, from a short, thickened, fibrilbearing, erect and thick-rooted rhizome.

Stems.--Branching only at the inflorescence, angulate-ribbed below, often purplish, lower ridged toward the apex, there with some short, thick-tipped hairs.

Leaves.--Basal leaves longest, mostly 8-20 cm long, smooth, the petioles narrowly winged, as long as or longer than the blades which are narrowly to broadly elliptic, the tips acute but blunt, the margins entire, the base long-attenuated, the surface triple-nerved. Lowest leaves often clustered toward and around the base, these grading gradually upward to shorter, distant, stem leaves, these then grading into small, oblong or lineal inflorescence leaves.

Inflorescence.--Heads 2-10, usually several, each terminating a long, ridged, sparsely hairy peduncle in a candelabra-type arrangement, in full bloom to 2.5 cm broad and 1.5 cm high. Involucral bracts several in about 2 series, spreading ascending and loosely overlapping, linear, greenish with purplish tints, the tips acute, the margins entire with a thin, often purplish narrow border, the backs smooth, with a few, raised longitudinal nerves.

Flowers.--All discoid, the corollas whitish, with linear, spreading lobes from which project the pale lavender anthers and the narrow, blunt-tipped, whitish style branches.

Fruit.--Akenes each with a linear, firm, whitish scale at the base (the pale), this projecting bristle-like from the fruiting head. Akene body about 4 mm long, oblong and ribbed, the ribs short-hairy, the intervals with sessile resinous glands. Akene body capped by a ring of narrowly triangular, acuminate, ragged-margined, thin, whitish scales.

### Distribution and Flowering Season

M. mohrii is known only from Lookout Mountain in northwest Georgia and a few counties in northern Alabama. It flowers from mid-May through June.

### Habitats and Management Implication

M. mohrii is a species of grassy or grass-sedge clearings, usually moist to wet springy places, as in natural clearings of mountainous woodlands. In the one fairly large area still known for the species, the surrounding forest type is mixed-hardwood, with Shumard oak and willow oak types predominating, together with a scattering of pine. The soil is a sandy clay with a highly organic fraction, and poorly drained.

The species appears to be maintaining itself only in areas that are naturally or artificially cleared in these local "flatwoods" complexes. It definitely is reduced where the hardwoods and understory shrubs invade, and probably was maintained naturally through occasional fire or through local soil conditions that promoted a relatively closed community of grass-sedge. Clear-cutting would increase M. mohrii providing this was unaccompanied by drainage, as this is a species of high hydroperiod soil. Mechanical disturbance of the soil through preparation of the site, if unaccompanied by drainage might prepare openings for its seeds to germinate (I have observed one such event). Late season burning of the competing grass-sedge-forb complex in which M. mohrii grows would tend to maintain the species.

Opening of the stand with subsequent improvement for pasture through introduction of fescue or other forage grasses would eliminate the species as a result of competition at its root level. Cattle will feed on this species.

#### Suggested Reading

Small, J. K. 1933. Manual of the Southeastern Flora. Chapel Hill.

Channell, R. B. 1957. Contributions from the Gray Herbarium of Harvard University 181:41-132.

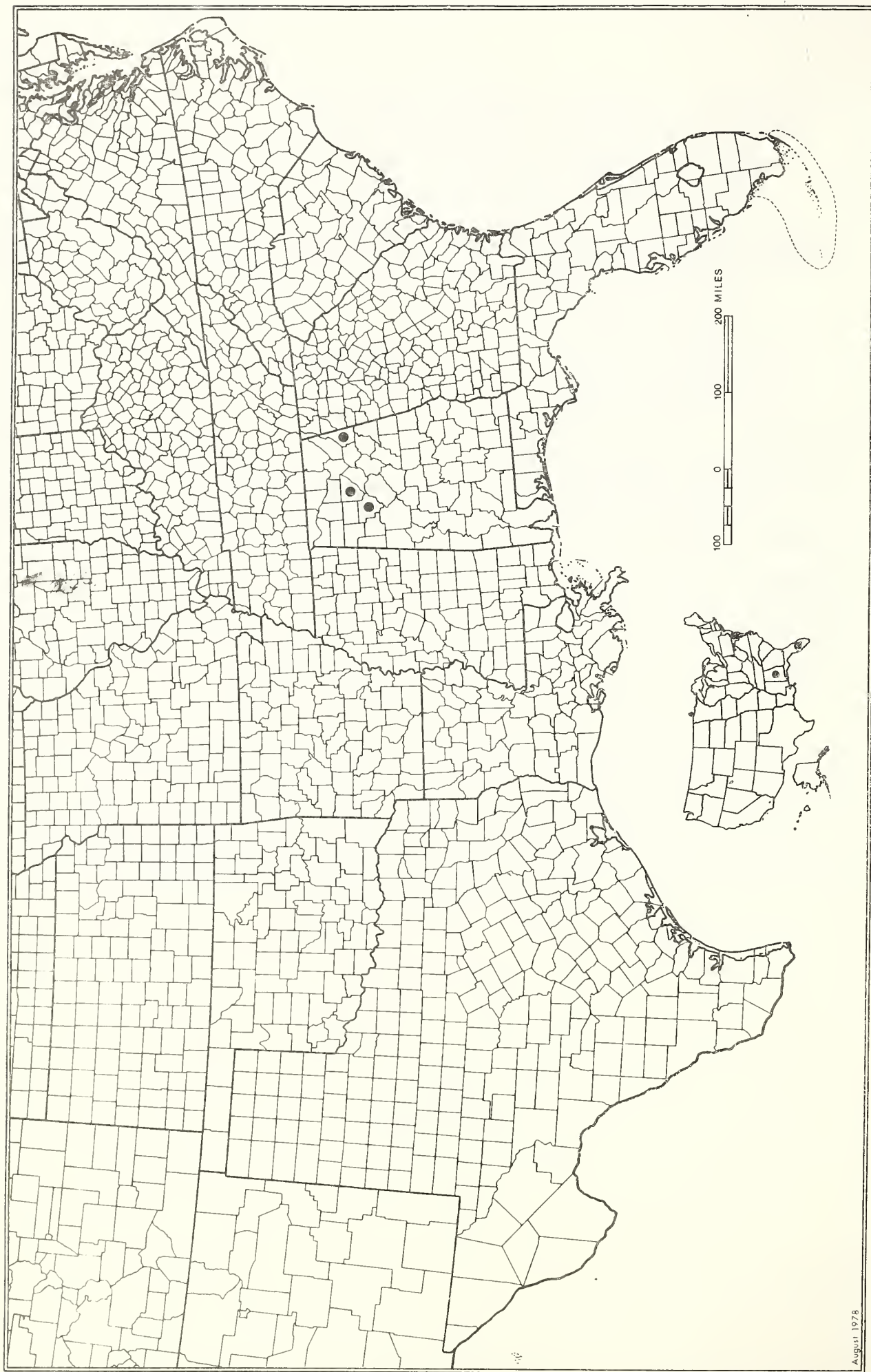
SPECIES: #124 Marshallia mohrii Beadle and Boynton; Mohr's barbara's-buttons

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		X	X	X				X
Damage								
No lasting effect								
Beneficial if done properly	X				X	X		

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980



MAP 124. MARSHALLIA MOHRI

## ASTERACEAE

Solidago albopilosa E. L. Braun; White-haired goldenrod

## Technical Description

Perennial from a short, sometimes thickened caudex.

Stems: The stems mostly 3-10 dm. long, solitary or several from ascending rhizomes, erect, ascending or laxly spreading, soft, terete and low-ribbed, white-pubescent with abundant cottony hairs.

Leaves: Alternate, all petiolate, those of the lower stem and rosettes largest (lowermost stem leaves usually absent by flowering time), the largest mostly 6-10 cm. long, with petioles fully half the total length, the blades broadly elliptic or ovate, acute or acuminate, coarsely serrate, the bases abruptly narrowed to the petiole, thence attenuated along it to near its middle or below, the texture thin and soft, the upper surface dark green with soft, appressed hairs, the lower surface paler with soft, appressed hairs, and strongly soft pilose along the veins. Leaves gradually reduced in size upward, those from about mid-stem upward often developing short or fairly elongate, ascending or spreading branches or racemes.

Inflorescence: Heads in flower mostly 4-6 mm. high, turbinate, on slender, soft-pilose peduncles 3-5 mm. long, these with numerous short-oblong, green, ciliate bracts that grade into the bracts of the heads. Involucral bracts several, in several series, loosely imbricate, the outermost shortest, the larger ones 3-4 mm. long, oblong, acute, thinnish, the midpart green with a paler midrib plus some indistinct lateral nerves, the apex thin, acute or rounded, ciliate, the margins broad, pale, very thin.

Flowers: Ray florets mostly (3-)4-8, the spreading oblong-linear rays about 5 mm. long, bright yellow. Disc florets 15-+ the corollas yellow, about 3 mm. long, the narrow tube flaring into a narrowly campanulate throat and short-spreading, triangular toothed limb.

Fruit: Akene narrowly oblong, pale brown, strongly silvery pilose with hairs ascending; pappus fine, white, nearly as long as the disc corollas.

## Distribution and Flowering Season

Sandy rockhouses in the Red River country of the Cumberlands of Kentucky; flowering mostly in September.

## Special Identifying Features

Original and subsequent descriptions indicate that the most distinguishing character of this species is its pubescence, otherwise it is rather similar to S. flexicaulis, but does differ also in its much thinner leaves and an even softer lax habit. According to Andreassen (1970) these plants have few, if any, chromosome abnormalities in most individuals or populations.

## Habitats and Management Implication

S. albopilosa is found associated with Heuchera parviflora, Campanula divaricata, and Silene rotundifolia (other common rock-house species) in sites under projecting cliffs and roofs of rock-houses. There, as Braun (1942) noted, it may be abundant enough to carpet the sandy ground but it stops along a line even with the cliff edges above. It is a plant of at least partial shade therefore, in what would be described as a mixed-mesophytic forest involving an overstory of mixed oak, Hard Maple, Red Maple, Nyssa, Aesculus, with an understory of various deciduous magnolia species, Flowering Dogwood, Rhododendron maximum and Kalmia. The soil is nearly a pure sand derived from sandstone of the Pottsville Formation.

The topography is steep and quite erodable. While the plants occur in comparatively protected places such as in the shadows and crevices of rockhouse overhangs and ledges, intensive logging of contiguous mesophytic forest could impact the sites through increasing light and thus drying, or through increasing susceptibility to erosion. Another factor accompanying such logging would of course be the subsequent increase of undesirable woody weeds such as Rubus, Smilax, Lonicera, as well as the troublesome Pueraria.

## References

- Andreasen, M. L. 1970. Solidago albopilosa Braun, Species and Population dynamics. M. S. Thesis, Miami University.
- Braun, E. L. 1942. A new species and a new variety of Solidago from Kentucky. Rhodora 44 (517):1-4.
- Fernald, M. L. 1950. Gray's Manual of Botany. 8th Ed.: 1381-1413.

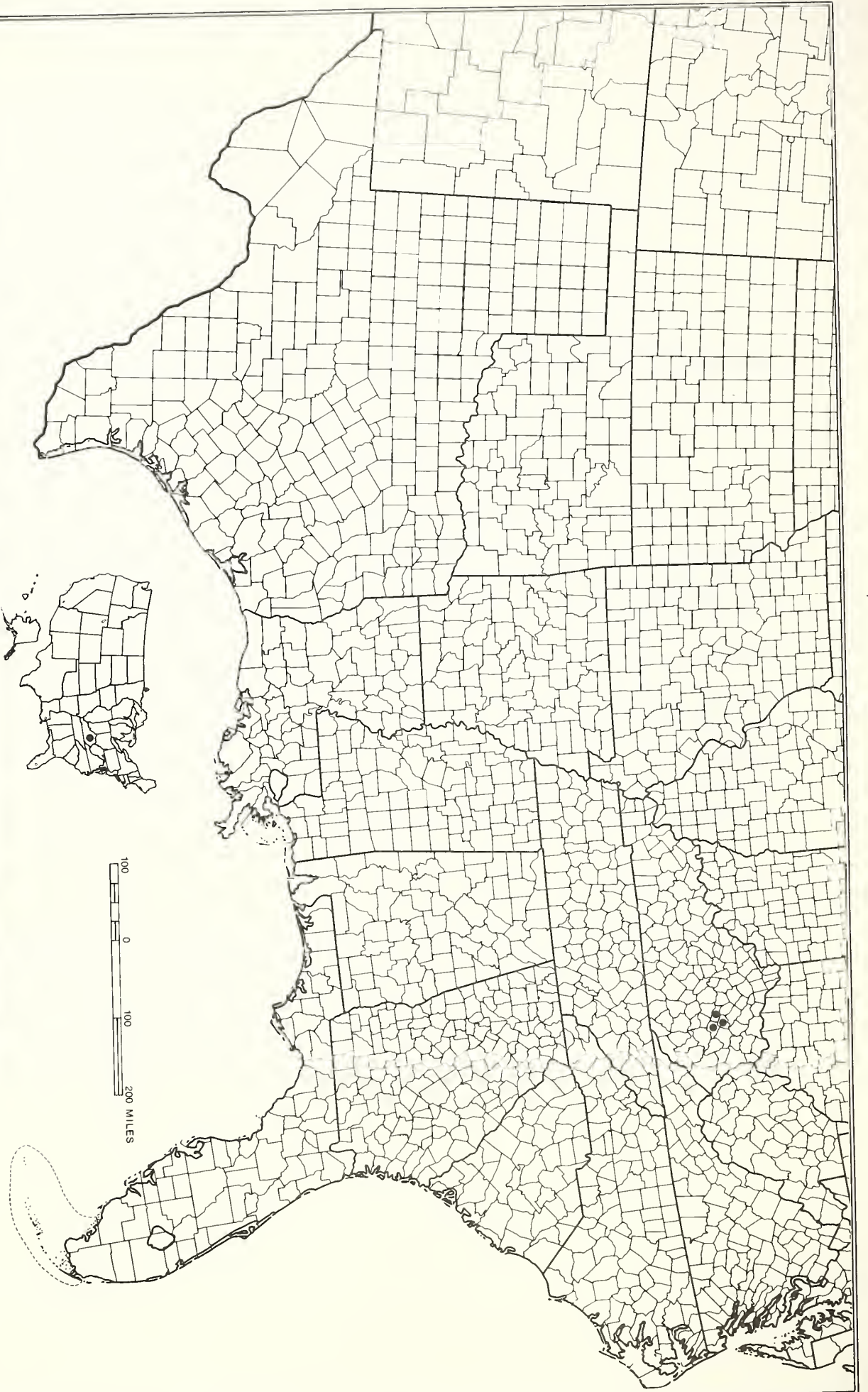
SPECIES: #125 Solidago albopilosa E. L. Braun; White-haired goldenrod

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy	X					X		X
Damage					X			
No Lasting Effect				NA			NA	
Beneficial if Done Properly								

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 125. *SOLIDAGO ALBOPILOSA*

CARYOPHYLLACEAE

Silene polypetala (Walt.) Fern. & Schub.; fringed campion

S. baldwinii Nutt.

Technical Description

Stems.--Perennial, the one to several shoots erect or ascending, to 4 dm, simple or sparingly branched, soft, and with soft, long hairs, reproducing vegetatively by long, slender stolon-like rhizomes and lax, leafy offshoots, both terminating in overwintering rosettes.

Leaves.--Rosette and lower stem leaves spatulate, 3-9 cm long, soft, spreading, pale-green, the tips rounded, sometimes with a short mucro, the margins entire, the bases long-attenuated, the petiole thus winged, the surfaces with soft, pale spreading hairs along the margin and mid-rib beneath. Leaves progressively shorter up the stem, opposite, becoming elliptic, oblong or lanceolate, with rounded, even clasping bases.

Inflorescence.--Flowers few, 3-5 on slender, hairy, erect or slightly spreading stalks in a terminal cyme, sometimes with another, fewer-flowered cyme on the next lower node.

Flowers.--Calyx tubular, 2-3 cm long, with long, weak, clammy hairs, the calyx lobes 5, narrowly triangular 7-9 mm long, erect. Petals distinct, 5, the claws about as long as the calyx, the blades spreading, subequal, 3-4 cm long, obdeltoid, the truncate apex divided into slender segments (fimbriate), the whole petal a coral pink, or white. Stamens 10, not much longer than the petal claws. Ovary superior, styles 3-5, distinct, slender; placentation free-central.

Fruit.--An ovoid, many-seeded, capsule 7-9 mm long, thus hidden in the persistent calyx.

Distribution and Flowering Season

This rare and showy species is found in rich woods in the Piedmont and Coastal Plain of Georgia, and contiguous northern Florida. It blooms from late March through April.

Habitat and Management Implication

S. polypetala is found on well drained loamy (usually sandy-loam) soils under hardwoods. This definitely woodland species, being dependent on the rich, humified loams engendered by the litter of a mostly deciduous overstory, would react adversely to heavy logging or any site manipulation that would admit much insolation or depletion of the humus. Conversion of hardwood to pure pine overstory would eliminate the species. Many early spring flowering herbs are interesting in that they are light-dependent during their early period of bolting and flowering, shade-dependent later during their periods of fruiting and dormancy. They can have such conditions only under mixed deciduous, old, forest.

### Suggested Reading

Fernald, M. L. & B. G. Schubert, 1948. Studies of American types in British herbaria. *Rhodora* 50:181-208

Small, J. K. 1933. Manual of the Southeastern Flora. The University of North Carolina Press. 505-507.

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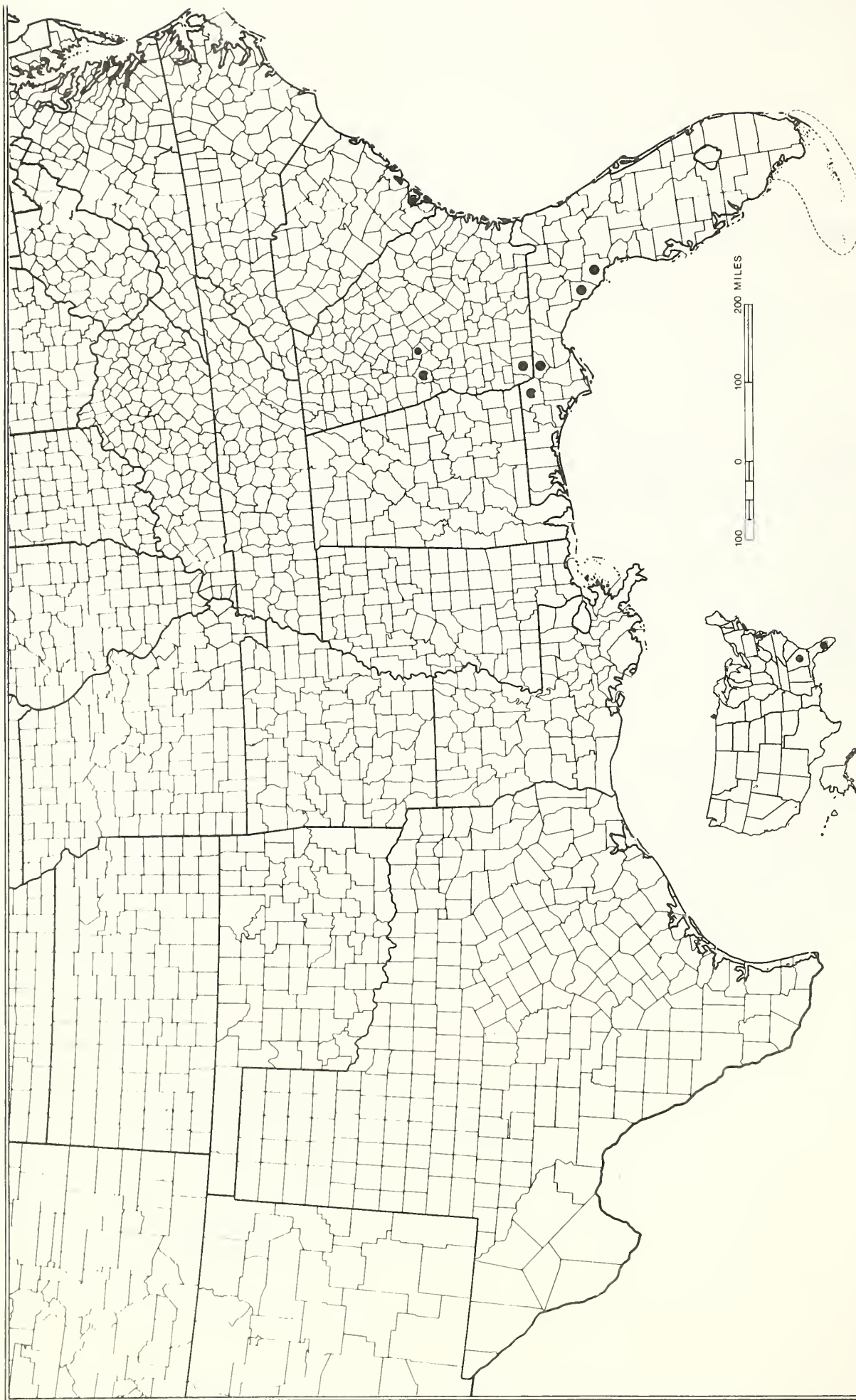
SPECIES: #126 Silene polypetala (Walt.) Fern. & Schub.; fringed campion

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy						X	?	
Damage	NA	NA	NA	NA				X
No lasting effect								
Beneficial if done properly					X			

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980



MAP 126. *SILENE POLYPETALA*

ERICACEAE

Rhododendron chapmanii A. Gray; Chapman's rhododendron

Azalea chapmanii (A. Gray) O. Ktze.

R. minus Michx. var. chapmanii (Gray) Duncan & Pullen

Technical Description

An evergreen shrub to about 2 m tall, usually less.

Stems.--Habit bushy, the many shoots ascending, the rebranching ascending, stiffish. Bark of older growth thin, gray, slightly breaking away in longitudinal strips, that of new shoots reddish-brown, dotted with old, warty glands.

Leaves.--Alternate, elliptic or obovate, the blades mostly 3.0-6.5 cm long, spreading or ascending on short, glandular-scaly stalks, acute to somewhat rounded, the margins entire, slightly revolute (margin turned under), the base cuneate or short-acuminate, the upper surface dark yellow green and sparingly gland-dotted, the lower surface reddish because of a lot of flattish reddish glands.

Inflorescence.--A short, compact raceme, the individual flowers on ascending, slender, densely glandular pedicels slightly more than 1 cm long. Flower buds terminal on most shoots, the flowers from large, ovoid, imbricate buds, the scales of which are oblong-ovate, rounded or short-acuminate, the backs reddish-gland-dotted, the margins white-ciliate.

Flowers.--Calyx a shallow 5-toothed, stiffly long-ciliate, glandular cup at anthesis (full bloom) about 2 mm long. Corolla with the fused 5 petals funnel-shaped, mostly 3.0-3.5 cm long, the slightly spreading lobes somewhat unequal (the largest lowest), ovate - the tips obtuse angled, the petal surfaces roseate, with a scattering of pale sessile glands. Stamens 10, somewhat unequal, the filaments pale pinkish, projecting the oblong anthers beyond the corolla throat. Ovary oblong-ovoid, superior, about 4 mm long, densely sessile-glandular, the style reddish, elongated beyond the corolla limb, the stigma a glandular, lobed button.

Fruit.--Capsules lance-ovoid, slightly longer than 1 cm, with 5 longitudinal ribs, sessile-glandular, erect on the slightly thickened pedicels. Dehiscence septical, the many seeds inequilaterally oblong, pale reddish-brown, finely longitudinally lined.

Distribution and Flowering Season

R. chapmanii, which blooms in March and April, is known certainly to occur in drainages tributary to the Apalachicola River in northwestern Florida, with outliers reported from northeastern Florida, southwestern Georgia and southeastern Alabama. There are few known localities, these best left relatively unpublicized.

## Special Identifying Features

This species, sometimes treated as a variety of *R. minus*, blooms before the new leafy shoot growth commences and has as a rule blunter-tipped leaves.

## Habitats and Management Implication

*R. chapmanii* is soboliferous, producing rather large clones from the parent shrub, and appears to prefer acidic, moist to wet, highly organic sands. Typically it is found in the longleaf pine-turkey oak complex, where this type borders on ti-ti (*Cyrilla*), thus is mainly ecotonal (on the border of the two types). Often it is found mixed with Gallberry (the two species), *Lyonia ferruginea*, *Magnolia virginiana*, never in dense shade but frequently in open stand shade of bordering longleaf. Clear-cutting of the pine-oak type would probably not affect this species adversely, unless it were accompanied by heavy mechanical disturbance. If site preparation for the pine involving soil removal or disruption (root-cutting, windrow-bulldozing, crushing, plowing etc.) were to extend into these shrubs the effect of course would be negative. Burning of the stand would impact the shrubs, but periodic burning is a part of their ecological setting; the species is a prolific sprouter in response to fire. Grazing, may result in mechanical damage to the shrubs, but ericaceous plants are not favored by grazing animals--some indeed are toxic to them. Drainage of the ti-ti type to increase habitat for pine would perhaps constitute a major hazard, drying out the habitat to a bad degree for the rhododendron.

The main enemy of *R. chapmanii* thus far has been the irresponsible gathering of whole shrubs by nurserymen and amateur gardeners to the point where whole clones, even populations, have been destroyed.

## Suggested Reading

Chapman, A. W. 1860. *Rhododendron* in flora of the southern United States. Ivison, Phinney & Co., New York. 621 pp.

Duncan, W. H. and Pullen, T. M. 1962. Lepidote rhododendrons of the southeastern United States. *Brittonia* 14:290-298.

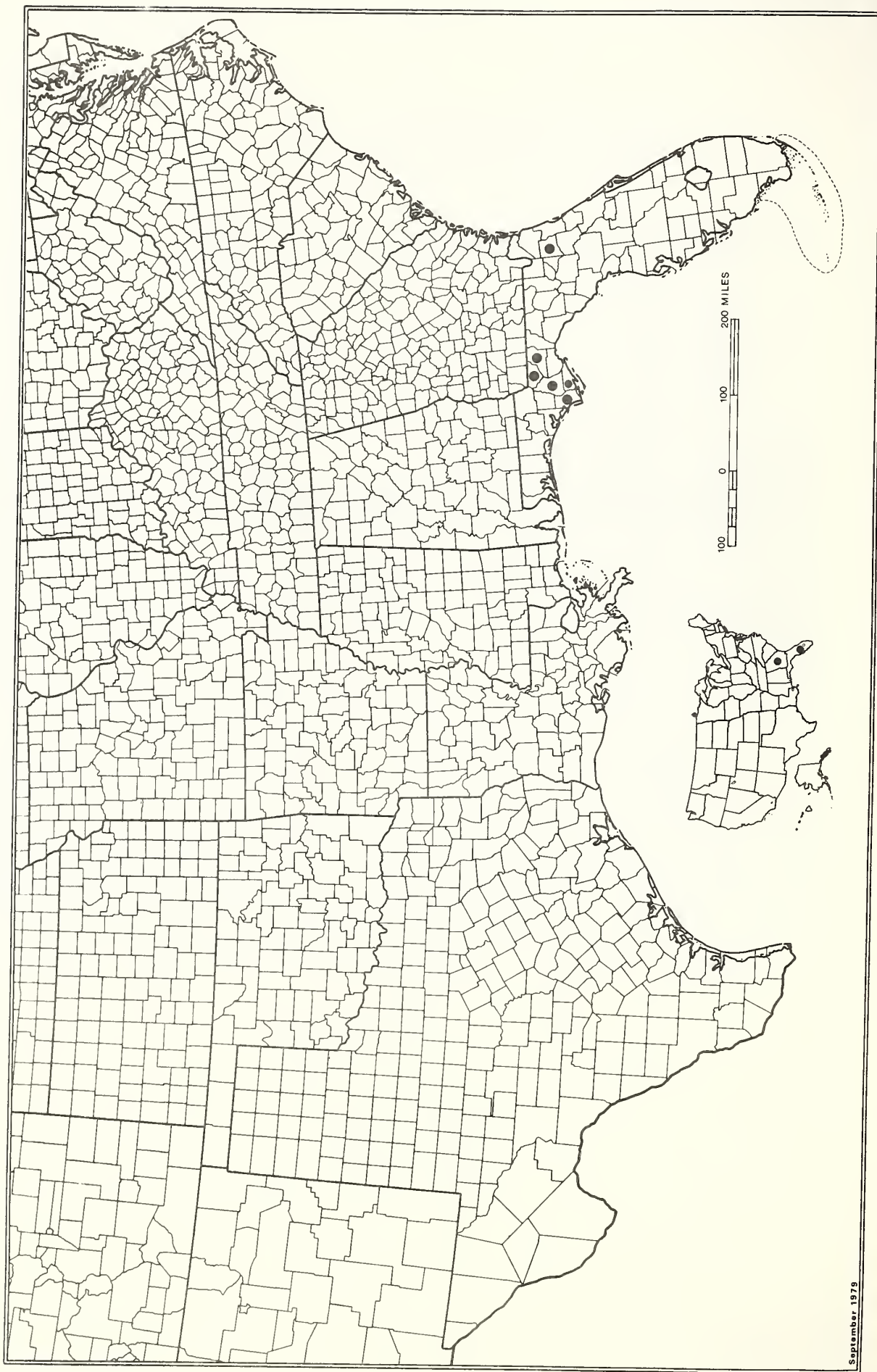
Small, J. K. 1933. *Manual of the southeastern flora*, pp. 997-998.

SPECIES: #128 Rhododendron chapmanii A. Gray; Chapman's rhododendron

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		X		X				
Damage			X					
No lasting effect	X				X	X		X
Beneficial if done properly								

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—



MAP 128. *RHODODENDRON CHAPMANII*

LENTIBULARIACEAE

Pinguicula ionantha Godfrey; Violet-flowered butterwort

Technical Description

Perennial, forming rosettes to 15 cm broad from a very short stem and a shallow, diffuse root system.

Leaves: Numerous, spreading, thinnish but succulent, somewhat involute to quite strongly inrolled, mostly elliptic to oblong, mostly 4-7 cm long, rounded, entire, the surfaces above with a covering of small glandular hairs, greenish or tinted with maroon.

Inflorescence: Peduncles 1 to several, arising progressively during flowering, erect or ascending, round in cross section, fleshy, pubescent with spreading, gland-tipped hairs, rarely longer than 2 dm., each terminating in a single flower.

Flowers: Flowering calyx about 7 mm broad, the tube short, the 5 short-oblong, glandular lobes opening laterally and enfolding the corolla base, the upper 3 longest, directed forward (upward) the lower 2 downward and outward. Corolla with a narrowly bell-shaped tube about 7 mm high, its attachment lateral, thus the base of the tube directed downward and with a narrow curved spur pointing downward and outward, and the opening directed upward: corolla limb, spreading to a flower about 2 cm across, lobes 5, nearly equal, obovate, notched at the apex to form 2, low-triangular lobes; corolla surface with limb near white or pale violet with a deeper violet "eye," the tube violet with darker violet lines, the spur often yellowish. Palate projecting forward, conic, covered with minute club-shaped hairs apically. Stamens 2, arising from upper wall of corolla tube, the anthers on forward and inward-arching, short, thickish filaments, and nearly touching. Ovary superior, nearly round, the style short, terminating in a broad, 2-lobed stigma.

Fruit: Capsule round, about 5 mm broad, thin-walled, 2-valved, enfolded at base by the now ascending calyx tube and its slightly spreading lobes. Seeds narrowly wedge-shaped, the surfaces honeycombed.

Distribution and Flowering Season

In bogs, cypress domes, depressions in flatwoods and savannas, often in shallow standing water, northwestern Florida from Franklin to Bay counties. Flowering in March and April.

Special Identifying Features

This is the rarest of southeastern Pinguicula, closest in character to P. planifolia but with rosette leaves more green (usually) and corollas paler, not as broad, the corolla segments broader and not as deeply notched.

#### Habitats and Management Implication

P. ionantha is a plant of full sunlight and of high hydroperiod, acidic, bog soils. Thus logging of the cypress, pond pine, slash pine or long-leaf pine of its area would tend to encourage increase, as would fire or site preparation of any sort that reduced competing ground cover without disturbing the substrate or reducing the ground water. Drying out through drainage of the organic soils it grows on would eliminate it, as would conversion to pasture or row crop agriculture.

#### References

1. Godfrey, R. K. and H. Larry Stripling. 1961. A synopsis of Pinguicula (Lentibulariaceae) in the southeastern United States. Am. Midl. Nat. 66 (2): 395-409.
2. Small, J. K. 1933. Manual of the southeastern Flora. 1232-1233.

Revised March 1980

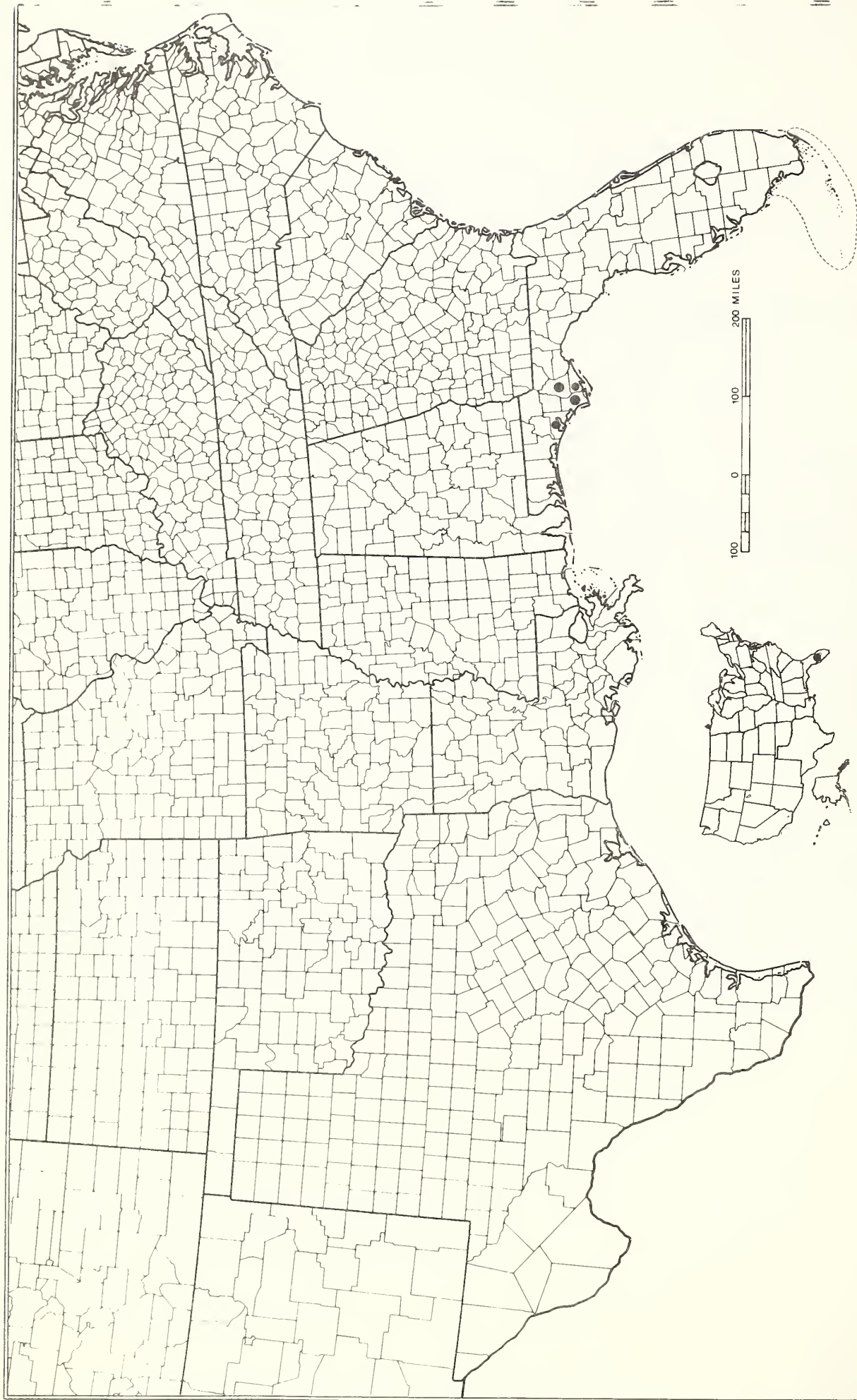
SPECIES: #132 Pinguicula ionantha Godfrey; Violet-flowered butterwort

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	X
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

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MAP 132. *PINGUICULA IONANTHA*

LILIACEAE

Harperocallis flava McDaniel; yellow-petaled Harper's beauty

Technical Description

Smoothish perennial, increasing by shallow, slender, swollen -  
noded rhizomes.

Stems: The short stems usually sheathed at base by fibrous old leaf bases.

Leaves: Close-set at plant base, equitant and distichous (as in Iris)  
slightly spreading, linear, mostly 5-20 cm. long, mostly 2-3 mm. wide,  
the sheathing bases thin, straw-colored to near white, the blades flat  
or slightly twisted, prominently ribbed, pale green, firm, acute, entire.

Inflorescence: Scape slender, elongate, to 5.5 dm. high, pale yellow-  
green, with 3-5 distant, small, chaffy, erect clasping entire bracts.  
Flower solitary at scape tip, usually with 3 broadly triangular chaffy  
bracts to 3 mm. long, these persisting as a cup.

Flowers: Tepals (calyx and corolla appearing alike) 6, persisting as  
in rushes, spreading in anthesis, erect in fruit, oblanceolate, acute,  
9-15 mm. long, yellowish above, greenish beneath, with several lengthwise  
nerves. Stamens 6, arising around base of ovary, ascending-erect, the  
filaments slender, tapering apically, 6-7 mm. long, the anthers oblong,  
attached at base, 2-3 mm. long, with a short, peglike apex. Ovary ovoid,  
3-lobed, 7.0-8.5 mm. long, minutely and copiously bumpy, the lobes each  
narrowing into separate, buttonlike stigmas.

Fruit: Capsule surrounded by erect, now greenish, purple-margined  
tepals, ellipsoidal, 8-9 mm. long, 3-chambered, the surface minutely  
warty. Seeds narrowly fusiform, pale, yellow, 2-3 mm. long, straight  
or curved and often twisted.

The above description is based in part on duplicates collected by  
Dr. McDaniel and upon his original description (1968).

Distribution and Flowering Season

Pine flatwoods savanna bogs, in Franklin County, northwestern Florida;  
flowering in May.

Special Identifying Features

Harperocallis has but 1 species, this discovered by Dr. Sidney McDaniel  
in 1965. It is in that section of the Liliaceae occupied by genera  
such as Tofieldia, Pleea, Narthecium, etc. and grows with species of the  
first two genera. So far it has been found only in the original localities.

## Habitats and Management Implication

The habitat appears to be along the transition between Cyrilla-Cliftonia and in open pineland bog, involves bog soils high in sand and peat, and is occasionally burned. In the more open, boggy sites it is found with Sarracenia, Xyris, Eriocaulon, Pleea and a wide variety of grasses and sedges. In the Titi, it is found around bases of Cliftonia, Myrica. The pines of the area are Pinus palustris, P. elliotii, P. serotina. Maintenance of this species is dependent primarily on: (a) continuance of some openings in the Titi-pineland bog transition; (b) absolutely no drainage ditches; (c) occasional ground fires hot enough to reduce competing grass-sedge and woody vegetation.

Since its discovery, this species is getting scarcer, primarily because there has been no fire in the area.

## References

McDaniel, Sidney. 1968. Harperocallis, a new genus of the Liliaceae from Florida. Journ. Arn. Arboretum 49: 35-40.

Revised March 1980

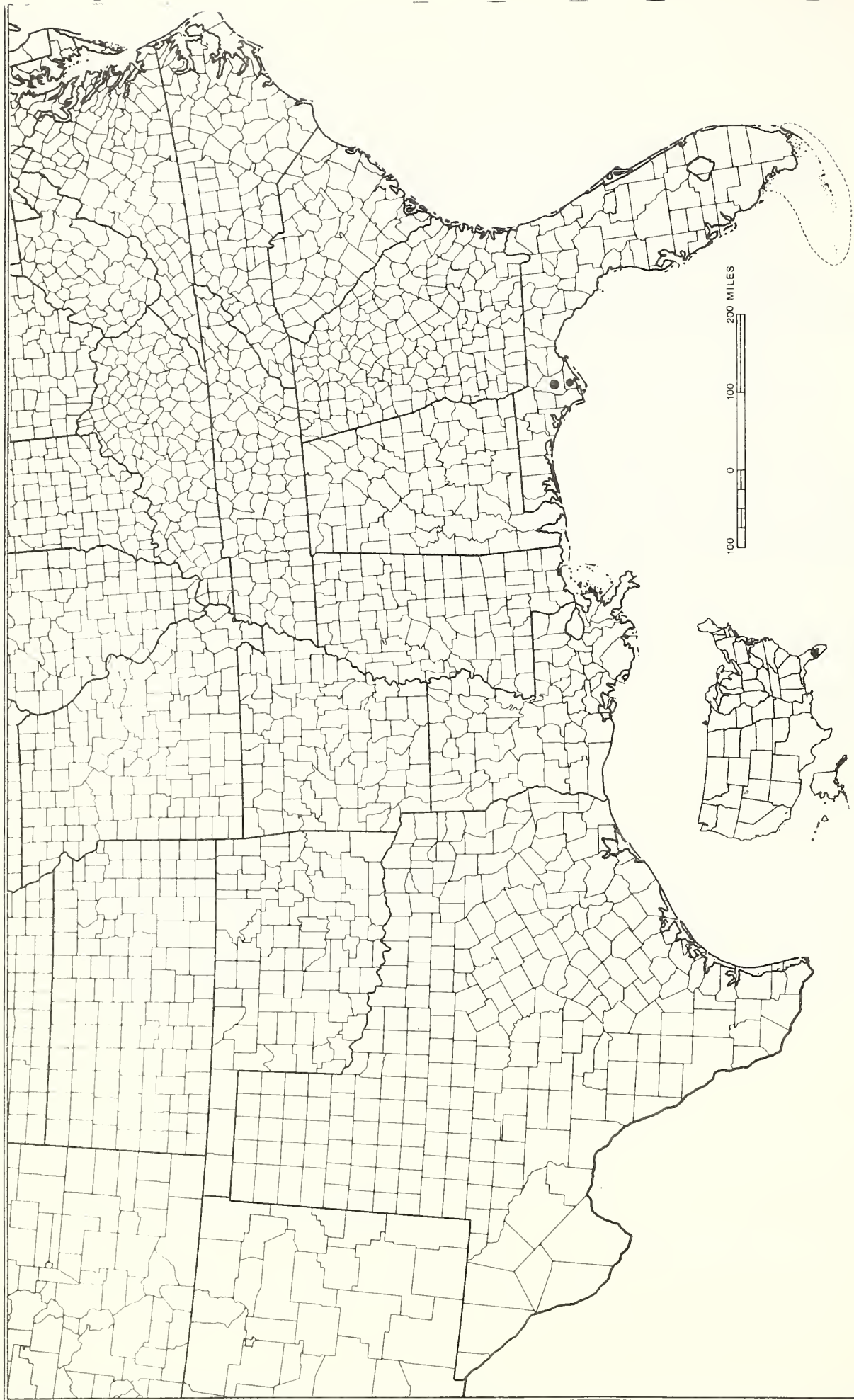
SPECIES: #134 Harperocallis flava McDaniel; yellow-petaled Harper's beauty

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



August 1978

MAP 134. HARPEROCALLIS FLAVA

AMARYLLIDACEAE

Hymenocallis coronaria (LeConte) Kunth; Stream-bank spider lily

Pancratium coronarium LeConte

Technical Description

Smooth perennial herbs to fully 1 m tall from tunicated (jacketed) ovoid bulbs to 1 dm long, 8 cm broad, these increasing by direct division rather than stolons, thus the plants are often in clumps, as are most Narcissus. Leaves.--Basal, fleshy, linear-lorate, to 8 dm long, 5 cm wide, narrowing shortly above the sheathing bases, dilating apically then narrowing to an acute apex, the margins entire, the surfaces bright deep green, the upper troughed save at the apex where flat.

Inflorescence.--Scapes mostly 8-10 dm long, stiffly erect, but spongy, to 2 dm thick, pale green, terminating in an involucre of several papery (at first green) suberect narrowly triangular to lance-linear, acuminate bracts mostly 4-8 cm long. Flowers mostly three to five in a headlike cluster, their bases hidden by the involucre.

Flowers.--Perianth tube in bud at first short, then elongating rapidly to fully 7-8 cm long, slenderly cylindrical, greenish or yellowish-white. Perianth segments six, elliptic-linear or lance-linear, 8-9 cm long, to 1 cm broad, spreading, white. Corona very broadly cupshaped, fully 1 dm broad, white, the six, whitish, elongate filaments arise and spread outward fully 2 cm from the corona edge between broadly two-dentate sinus rims. The inferior ovary develops into an ovoid, obscurely three-angled capsule 1.5 cm long.

Distribution and Flowering Season

Rocky or gravelly shoalwaters, banks or bars of swiftly flowing streams and rivers in the Piedmont and inner Coastal Plain, Georgia and Alabama. Flowers in May.

Special Identifying Features

The taxonomy of the genus Hymenocallis is perhaps more confused than that of any other North American genus of comparable size, much of it being based on the character of the flowers which themselves are poorly preserved on most specimens. Therefore, the Hymenocallis referred to here is called H. caroliniana, H. crassifolia, H. occidentalis, depending on the reference consulted. Whatever the case, this particular species is, for a Hymenocallis, distinctive, and it occurs in a distinctive habitat.

Habitat and Management Implication

H. coronaria is always on bars, banks or in shoalwater of clean, rapid streams. Often, its bulbs are rooted in cracks between tips of upended strata in streams,

or in muck-filled solution pockets in shallowly submersed rock. The bulbs increase like those of Narcissus, developing sessile offshoots, thus clumps of bulbs result. This is also the habit of the much more widespread H. occidentalis, but that species flowers in mid and late summer, has much smaller flowers, and, while it can occur in marshes it is also in upland situations.

The greatest threat to H. coronaria comes from disturbance of streams and streambanks. At one time, it must have been abundant in streams where they dropped over the fall line in Georgia. The damming up of such streams has, of course, destroyed the plants. Mechanical disturbance of streambanks has doubtless also taken its toll.

#### Suggested Reading

Fernald, M. L. and Bernice Schubert. 1948. Studies of American types in the British Herbarium, part III. *Rhodora* 50:193-194.

Kunth, C. S. 1850. Hymenocallis in *Enumeration Plantarum* 5:855.

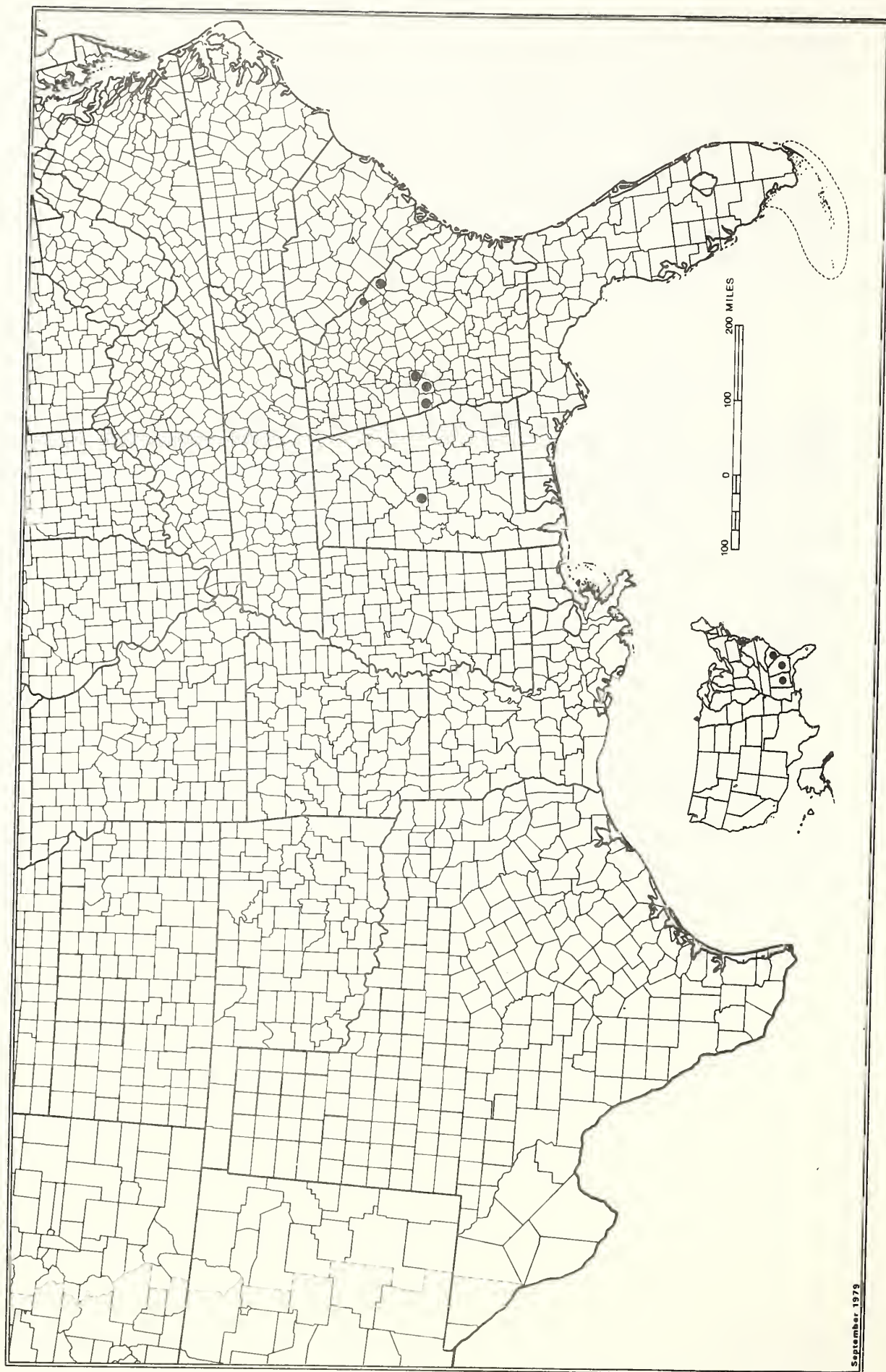
LeConte, J. E. 1836. Pancratium in *Ann. Lyc. N. Y.* 3:145.

#135 Hymenocallis coronaria (LeConte) Kunth;  
 SPECIES: stream-bank spider lily

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy	NA	NA	NA	NA	NA	NA	NA	NA
Damage								
No lasting effect	NA	NA	NA	NA	NA	NA	NA	NA
Beneficial if done properly								

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—



MAP 135. *HYMENOCALLIS CORONARIA*

LILIACEAE

Lilium iridollae M. G. Henry; panhandle lily

Technical Description

Perennial, from deep-set pale, fleshy-scaled roundish or avoid bulbs up to 4 cm broad, these producing spreading, pale, stiffish scaly elongate rhizomes which, in turn, develop bulbs terminally.

Stems.--Up to 2 m tall, smooth, terete, erect, toward base 0.7-1.0 cm wide, greenish with tints of brown or maroon, tapering upward into the inflorescence, there green or with reddish tints.

Leaves.--Elliptic-linear to elliptic, oblanceolate or narrowly obovate, mostly 5-10 cm long, deep green, erect to ascending or spreading, the lowermost and uppermost shortest and more erect, the lowermost tending to be scattered along the stem, the median and upper more often in whorls of 3-5, the apices acute to acuminate, the margins entire but closely or distantly scabrid (as are the main veins beneath), the bases cuneate or acute.

Inflorescence.--Flowers 1-5, (-8), nodding on leafless or short-bracted, usually elongate peduncles.

Flowers.--Tepals (petals and sepals nearly alike save in position on the flower) lanceolate--mostly 7-10 cm long, to 2.5 cm broad, recurved, dull to golden yellow with a deeper broad, medial line, spotted particularly toward the bases with brown and greenish and toward the base outside.

Filaments slender, greenish-white, 5-7 cm long, projecting forward (downward in regard to the ground) and outward; anthers linear, reddish-brown, versatile, ca. 1.0-1.5 cm long. Style straight, 2.5-5.0 cm long, slender, the stigmatic area 3-lobed.

Fruit.--Not observed.

Distribution and Flowering Season

Swamps, streambanks and bogs, lower Coastal Plain, northwestern Florida (Leon County) westward and northward through southern Alabama. Flowering in August.

Special Identifying Features

Mrs. Henry, who discovered the species, compared it (1946) with other species of southern lilies, with which it might overlap in range and with which it could be confused. (L. catesbaei, the most abundant Coastal Plain lily, is in an entirely different complex of the genus even though sometimes in similar habitat!) Of those species of Lilium with nodding flowers, it is closest to L. superbum which has been found both in northern Florida and southern Alabama in bogs and swamps. However, L. superbum lacks the quantity of scabrousness of leaf and leaf-vein edges or is perfectly smooth. Henry (loc. cit.) suggests a color difference, stating that L. iridollae is more

yellow; however, there are several extremes of color within good L. superbum and thus this character breaks down. L. michauxii resembles some broader-leaved extremes of L. iridollae and also tends to be few-flowered or single-flowered. However its leaves are smooth, its flowers broader, redder, and with a distinctively different fragrance; too, it tends to be a lower plant, with a distinctively upland habitat. L. canadense often has similar leaves, sometimes similar flower color (though it ranges to a strong red, also) but its perianth is not strongly recurved. Thus, while character differences are rather slight, the differences have some constancy.

#### Habitats and Management Implication

L. iridollae is always on high hydroperiod, acidic substrates, usually a very organic muck or sphagnum peat with sand incorporated. It is found either in light shade in acid swamps or swamp clearings or in full sunlight in open or shrubby, pineland bogs. Associate herbaceous species would be numerous sedges and grasses, other liliaceous plants such as Zygadenus, Tofieldia, Habenaria, Xyris, Calopogon, Eriocaulon, Sarracenia, and other herbs of sphagnum bogs and swamps. Common woody associates would be Cyrilla, Cliftonia, Myrica, Nyssa, Magnolia virginiana, Persea, Viburnum, Rhododendron, Clethra, Acer rubrum, Vaccinium, Gaylussacia, etc. It is thus often at the edge of shrub bogs and swamps, such as are found throughout the slash and longleaf pineland of the region.

While L. iridollae is often in and around thickets it, like several other wetland lilies, loses vigor as woody plant shade increases and the species ultimately dies out through shade and root competition. It is best maintained in swampy or boggy small clearings. Logging of contiguous pine or hardwood would affect it little. Fire would increase it by reducing shrubby competition. Drainage would eliminate this species. All lilies are highly palatable to both deer and cattle and are the first to go with any grazing pressure. The plants vanish quickly whenever swamp or bogs are opened to pasture. As Henry (loc. cit.) comments, hogs gouge up the bulbs and eat them.

#### Suggested Reading

Henry, M. G. 1946. A new lily from southern Alabama and northern Florida. *Bartonia* 24:1-4.

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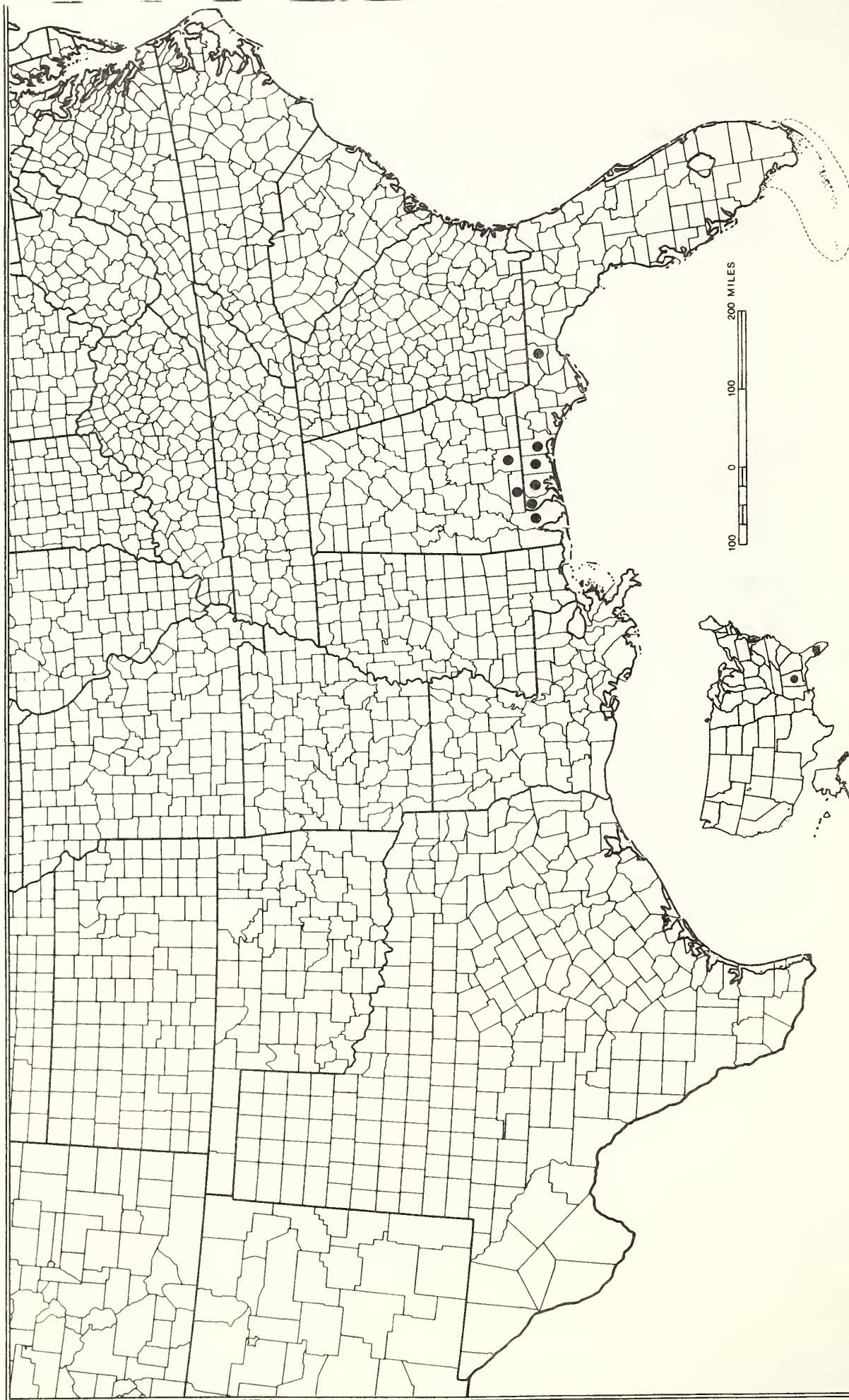
SPECIES: #137 Lilium iridollae M. G. Henry; panhandle lily

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		X	X	X			X	X
Damage						X		
No lasting effect								
Beneficial if done properly	X				X			

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980



MAP 137. L. M. IRIDOLLAE

LILIACEAE

Nolina atopocarpa Bartlett: Florida beargrass

Technical Description

Coarse smooth perennial from a thick, short fleshy rootstock (caudex), this bulblike, surrounded by scalelike leaf bases and by fibrous scales of old leaf bases.

Leaves: Elongate-linear, the longest basal, forming a rosette, spreading, mostly 5-6 dm long, with broad, overlapping bases in a tight low spiral, and narrowing acutely to elongate-linear, gradually tapering, spreading or ascending blades, to 4 mm. wide, these forming strong tufts very like some large cord-grasses, the blade surface strongly parallel-nerved and hard, the margins minutely scabrid. Stem leaves abruptly shorter, distant on the stem, finally reduced to short-linear bracts in the inflorescence.

Inflorescence: Stems 1-few per clump of leaves, mostly erect or ascending, wand-like, round in cross section, above the middle forming either a narrow simple raceme of small, numerous short-stalked flowers or a sparsely branched compound of these racemes. Flowers perfect or unisexual usually 2-3 per node of inflorescence on slender ascending pedicels mostly no longer than 5 mm, each small cluster subtended by an ovate to lanceolate, scale-like bract.

Flowers: Perianth of 6 equal separate spreading greenish-white parts, these elliptic, about 2-3 mm long, 1-ribbed, the tips minutely roughened (papillate), Stamens 6, about as long as the petals and sepals, the anthers broadly oblong-ellipsoidal, equal in length to the filaments or slightly shorter. Ovary superior, broadly ovoid or subglobose, the style absent or nearly so, the stigma with 3 round, broad lobes.

Fruit: Asymmetrically obovoid, usually not all 3 carpels developing seed, thus capsule uneven, 1-3 lobed, no longer than 5 mm, few-seeded.

Distribution and Flowering Season

Pine flatwoods, northeastern peninsular Florida and northwestern Florida (Franklin and Liberty Counties). Flowering in spring and intermittently through the summer.

Habitats and Management Implication

N. atopocarpa frequents slash or longleaf pine-saw palmetto flatwoods, usually where gallberry and myrtle, together with heaths such as blueberry, huckleberry, and Lyonia are also frequent in the shrub overstory. Its bulb-like caudices are set fairly deeply in a black, sandy-peaty high hydroperiod soil. It is usually observed in areas where fires have reduced the shrub understory to promote a savanna-like aspect of grass, sedge and other flatwoods herbaceous vegetation. Logging of the pine either selectively or by clear cutting would effect it little, nor does burning, as mentioned above. Site preparation involving root raking, bulldozing, chaining anything which would modify the soil top layers would have

a negative effect. Bedding, in that it involves disturbance only in strips, would perhaps have the least effect. Of course the pine plantation, once crown closure has taken place, would shade out this species. It has been observed only in clearings or in open, fire-scarred stands in the pinelands. Drainage of the site would also eliminate this, a species of damp substrates.

#### References

Bartlett, H. H. 1909. Nolina in the South Atlantic States. Rhodora 11:80-82

Small, J. K. 1933. Manual of the Southeastern Flora. 304.

Revised March 1980

SPECIES: #138 Nolina atopocarpa Bartlett; Florida beargrass

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



LILIACEAE

Nolina brittoniana Nash; Britton's beargrass

Technical Description

Similar in habit and leaf to N. atopocarpa, but leaves longer, the margins harsher, the tufts of leaves larger.

Stems: Taller, to fully 2 meters or slightly more, stiffer, more often erect, slightly angulate.

Inflorescence: More dense, with shorter more ascending branches, these with numerous, close set flowers, the whole inflorescence elliptic in outline and in bloom showy, white. Pedicels to 1 cm long.

Flowers: Perianth similar to the preceding, but white, the tips strongly papillose.

Fruit: Capsule 8-10 mm long, nearly or quite as broad, strongly 3-lobed, the lobes sharp-angled, the capsule tip and base notched.

Distribution and Flowering Season

Sandhills and dry pinelands, central and southern peninsular Florida.  
Flowering in Spring.

Habitats and Management Implication

N. brittoniana is found primarily in the scrublands, either in open long-leaf pine-palmetto or in the sand pine type, and typically associated with evergreen scrub oaks, saw palmetto, various shrub heaths, Osmanthus, Garberia, Ilex, Polygonella. It is usually on deep, well-drained, fine-textured sands. It is a cormophyte, and in association with species adapted to fire disturbance. Therefore cutting of the scattered pine it is in association with would effect it little. The difficulty would be in development to heavier pine cover which would shade out this species, this cover the result of mechanical disturbance of the soil. The least objectionable site preparation would be bedding, if this were to leave strips of undisturbed vegetation.

This species has had its area most depleted through the unfortunate fact that its best sites are also desirable for development both of housing and orange groves. Nearly all of its localities have thus been destroyed.

References

- Nash, G. V. 1895. Notes on some Florida Plants. Bull. Torr. Bot. Club. 22:141-161.
- Small, J. K. 1933. Manual of the Southeastern Flora, p. 304.



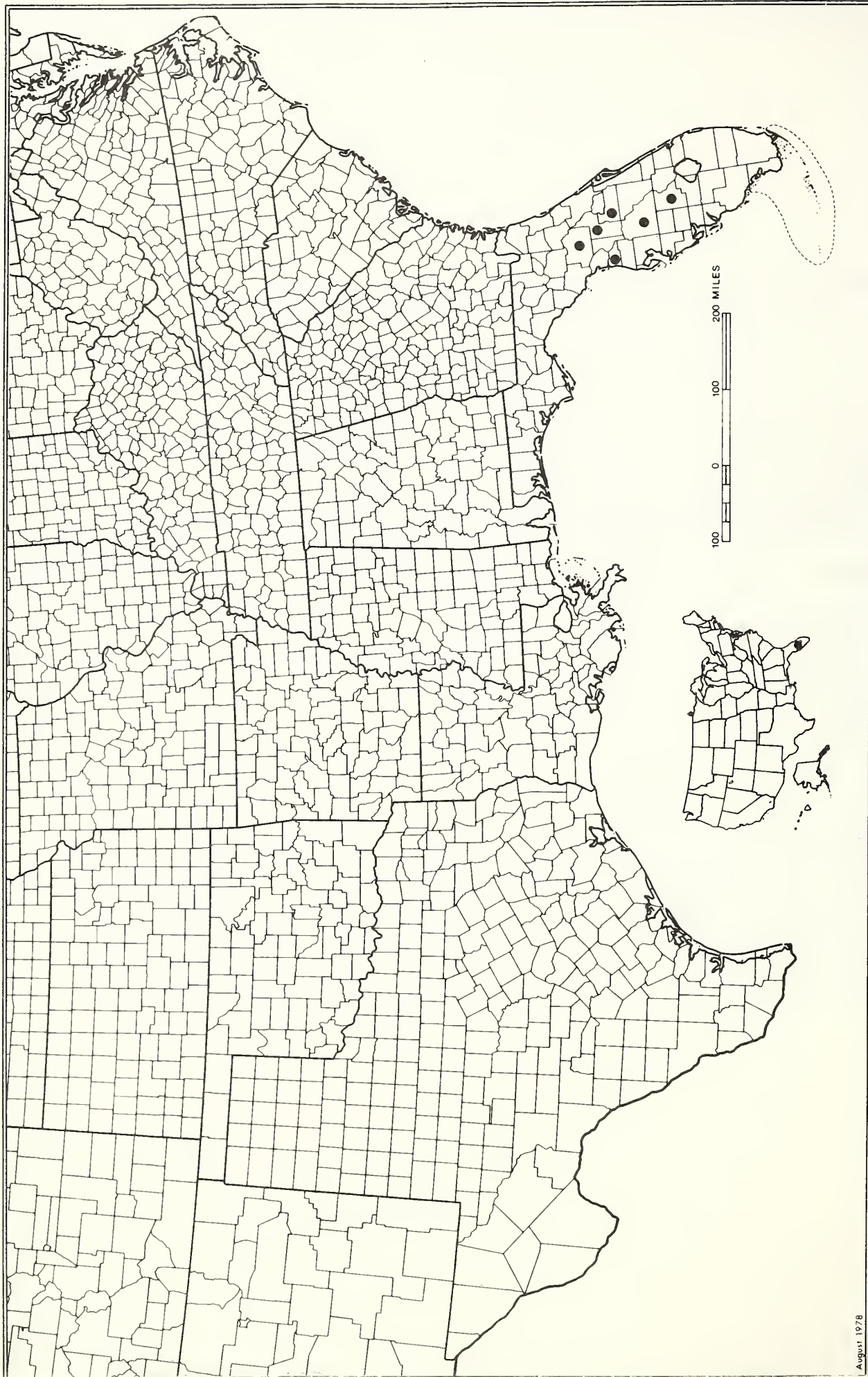
SPECIES: #139 Nolina brittoniana Nash; Britton's beargrass

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X	X	X	X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X							

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 139. *NOLINA BRITTONIANA*

LILIACEAE

Trillium pusillum Michx. (complex); least trillium

Technical Description

Low rhizomatous, smooth, perennial, the rhizome short oblong or elongate (sometimes forking), pale, horizontal or ascending, 1.5-5.0 cm long, 3-10 mm thick.

Stems.--Solitary or clustered through branching of the rhizome and arising terminally, mostly erect, 1-3 dm tall, slender, terete, greenish, sometimes tinted with maroon, pale toward the base.

Leaves.--Few, all scale-like, thin, overlapping at stem base (actually the "stem" is a peduncle or flower stalk); bracteal leaves normally three, spreading, lanceolate, oblong or elliptic, mostly 2-5 cm long, (rarely to 9.0 cm), the tips narrowed but blunt, the margins entire, the bases acute, sessile or nearly so, the upper surface dark green, three to five-impressed-nerved, the lower surface paler, raised-nerved.

Inflorescence.--Flower solitary, nearly sessile on the bracteal leaves or raised on a slender erect stalk to 3 cm long.

Flowers.--Sepals 3, equal, spreading or somewhat ascending, lanceolate-oblong or elliptic, blunt-tipped, 1.5-4.0 cm long, green. Petals 3, lanceolate, ovate-lanceolate or ovate, 1.5-3.0 (-3.5) cm long, blunt, at first ascending with outbending tips, white, lengthening and narrowing, becoming spreading, even slightly recurved between the sepals in age, deepening through pink, and rose to purple. Stamens 6, erect, the filaments white, flattened-linear, about 5 mm long, the anthers erect, linear, about as long as the filaments or slightly longer, dehiscing laterally. Ovary superior, ovoid, white sometimes suffused with purple, the slender but fleshy style branching mid-way, into 3 linear, spreading-ascending stigmas, the ovary body grooved and wing-angled along the sutures (carpel contacts).

Fruit.--Broadly ovoid or roundish, pale yellow-green, about 1 cm broad.

Distribution and Flowering Season

There are three varieties, distinguished on slight grounds, namely:

1. Trillium pusillum var. pusillum whose main range includes the Atlantic Coastal Plain from North Carolina southward into South Carolina with outliers in northern Alabama, middle Tennessee, and Kentucky. This variety has definitely stalked flowers, and bracteal leaves which are mostly three-veined.
2. Trillium pusillum var. virginianum Fern. (an endangered species) of tide-water Virginia, whose flowers are sessile or nearly so and whose petals are shorter than the sepals. This and the type variety are usually in low, alluvial woodlands.
3. Trillium pusillum var. ozarkanum (Palmer & Steyermark) Steyermark, with leaves, sepals and petals averaging broader and longer, with leaves mostly five-veined rather than three-veined. This last variety is more typical of upland hardwood forests of the southern Ozarks of Missouri. All varieties bloom early, from March into April.

## Special Identifying Features

The complex is quite similar to another dwarf trillium, T. nivale, of the Interior Lowlands, mainly the midwest. This species of rich hardwood forested (mostly hard maple, red oak, white oak) ravines, drained bottoms, shaded ledges can often be aspect dominant locally from Pennsylvania west to Minnesota, south to Kentucky and Missouri. T. nivale differs mainly in its petioled bracteal leaves, its narrower filaments, its recurved fruiting stalk. Its fruit, rather than being wing-angled along the carpel sutures, is more obtuse-angled.

## Habitats and Management Implications

All of the T. pusillum varieties are shade plants; var. pusillum and var. virginianum are typically in hardwood bottoms and swamps, not in those areas which are permanently inundated, but those which have high, though moist places. In some situations they may be crowded around the bases of larger trees where the ground is a bit higher; in other bottoms they may be scattered or abundant throughout. In any event, the alluvium is sandy and fertile, at least moist save in the driest periods. The outlying populations of var. pusillum in Tennessee and Kentucky are on rich ledges or even on ridgetops in upland forest. Var. ozarkanum is strictly an upland plant, according to Steyermark (1963) "in acid soils of shallow draws in thin cherty-flinty soils of oak-hickory, oak-hickory, oak-pine, or oak-chestnut woodland."

Clearcutting, often recommended for mixed bottomland hardwoods, the type in which var. pusillum and var. virginianum are found, would adversely affect these herbs for two reasons. Such disturbance would at least temporarily increase the amounts of water in the area logged, thus creating too wet a soil. Also, the amount of undesirable brush and vines would increase (i.e., Smilax, Lonicera, Rubus) together with rank herbaceous growth, while the Trillium are found in are found in relatively "clean" bottoms. Lastly, the Trillium are shade plants, not heliophytes. Undoubtedly these plants are rarer today because of clear-cutting of the bottoms within their range. In the cherty uplands frequented by some populations of T. pusillum pusillum and all T. pusillum ozarkanum, clear-cutting would admit both undesirable brush and weed competition, as well as light. Group or single tree selection would be far less harmful. Any mechanical site preparation following clearcutting would cause too much soil disturbance. Opening up of these habitats to grazing of any sort would also be a negative factor; Trillium simply do not persist in grazed forests.

## Suggested Reading

Fernald, M. L. 1943. Virginia botanizing under restrictions. Rhodora 45:357-413.

Fernald, M. L. 1950. Gray's manual of botany, ed. 8, pp. 443-446.

Gates, R. R. 1917. Systematic study of Trillium. Ann. Mo. Bot. Gard. 4:43-92.

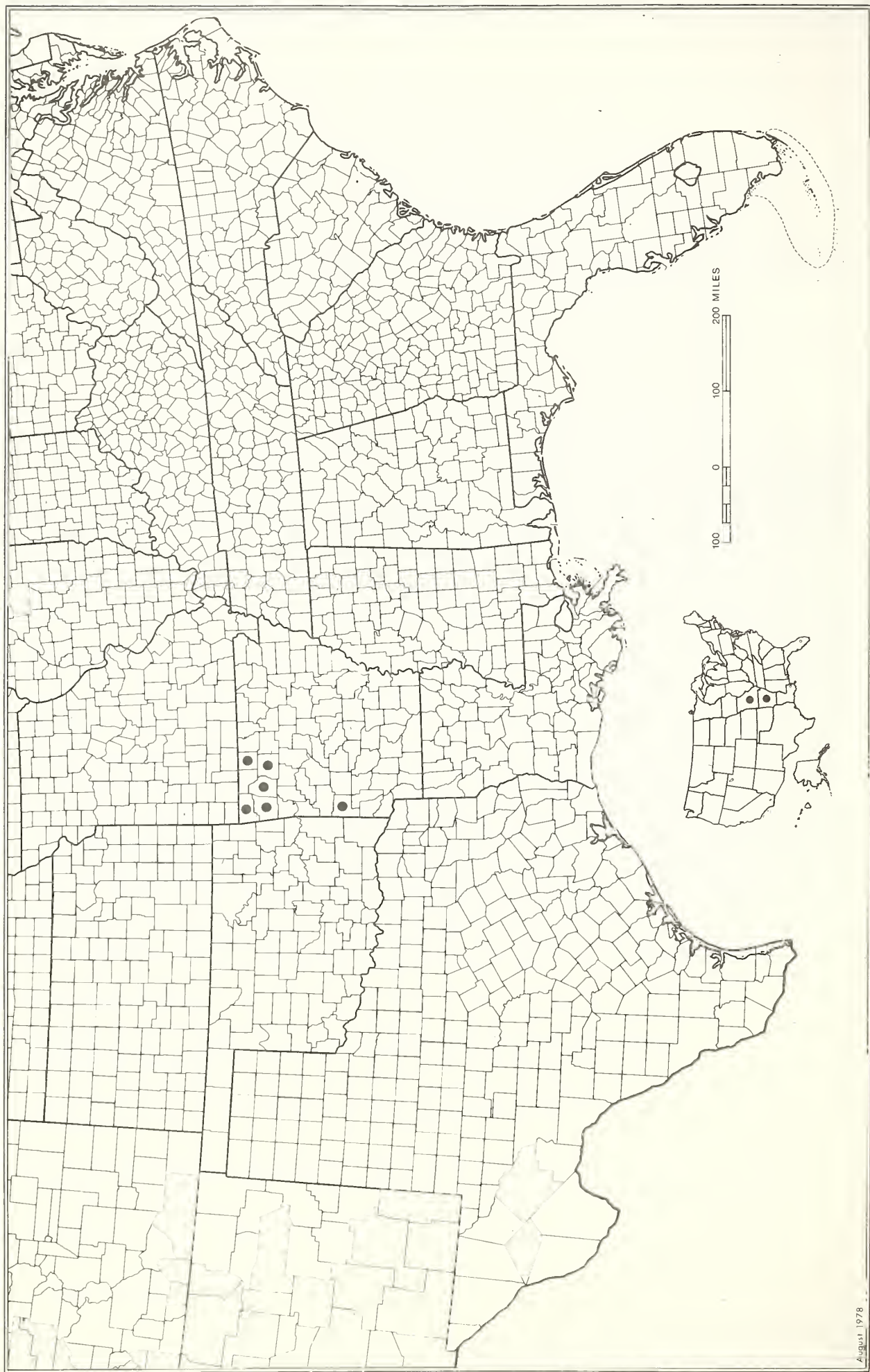
Steyermark, J. A. 1963. Flora of Missouri, pp. 443-448.

SPECIES: #140 Trillium pusillum Michx. (complex); least trillium

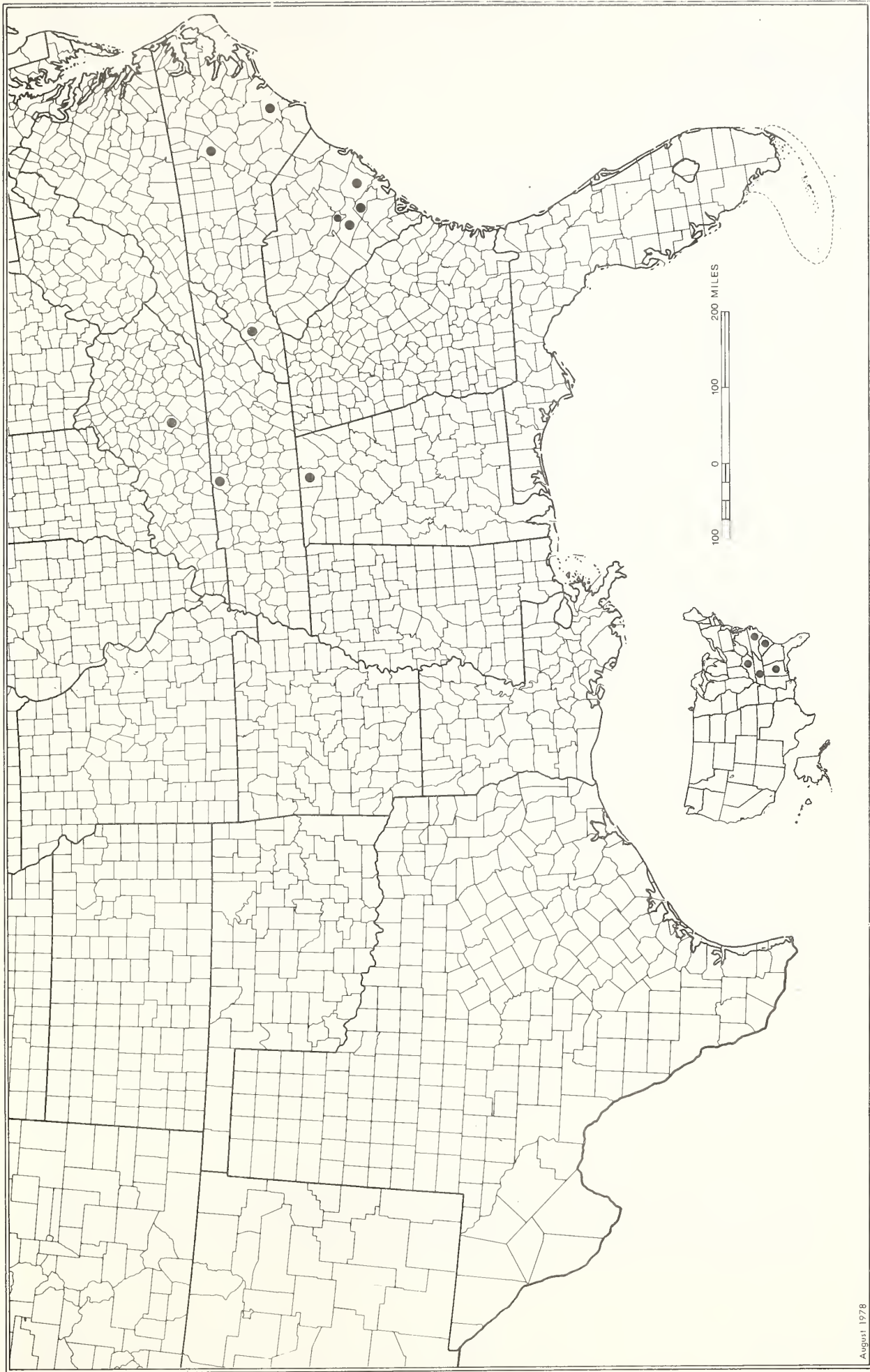
Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy	X (NA)	X	X	X	X	X	X	X
Damage								
No lasting effect								
Beneficial if done properly								

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

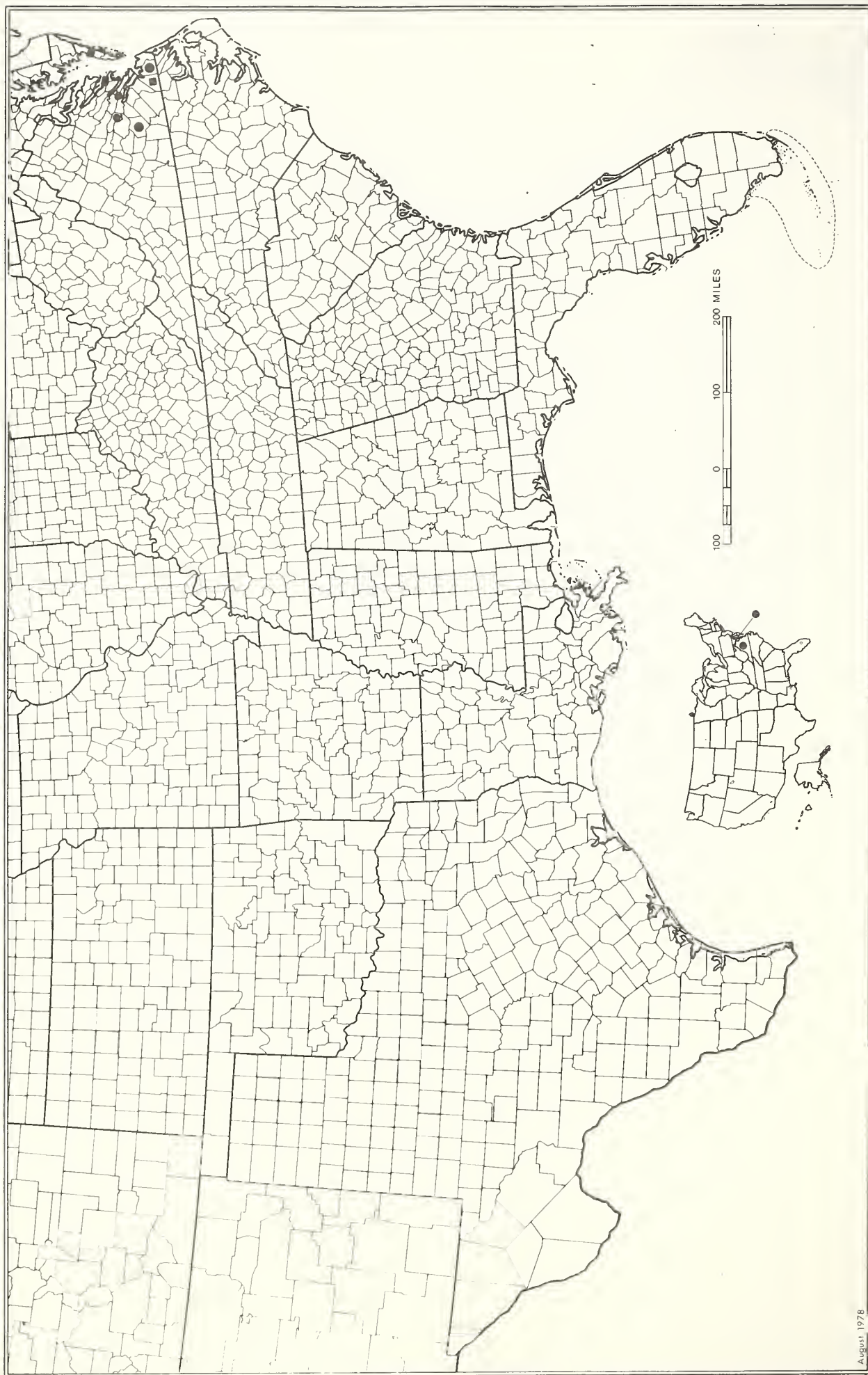
Other Comments.—



MAP 140A. *TRILLIUM PUSILLUM OZARKANUM*



MAP 140B. *TRILLIUM PUSILLUM PUSILLUM*



MAP 140C. *TRILLIUM PUSILLUM VIRGINIANUM*

LYTHRACEAE

Cuphea aspera Chapm.; Tropical waxweed

Parsonsia lythroides Small

Technical Description

Perennial from a woody, horizontally branched rootstock, this putting out slender offshoots terminating in spindle-shaped tubers which in turn develop shoots.

Stems: Few to several, either directly from old rootstocks or from slender offshoots, erect, stiffish, but slender, terete, mostly 2-3 dm. tall, hirsute with white, spreading, glandless hairs and somewhat longer, purplish, glandular hairs, thus sticky.

Leaves: Stem leaves opposite or in 3's, nodes numerous but well spaced, the blades sessile or nearly so, spreading, the lowest smallest, broad, the largest at about mid-stem, elliptic or lanceolate, acute, entire, the surfaces scabrous with short sharp appressed hairs, the margins scabrid. Leaves shortening and narrowing as the inflorescence is approached, there grading into mostly opposite, linear or spatulate bracts.

Inflorescence: Flowers mostly opposite or in 3's at the upper nodes and on strongly ascending, slender, hirsute stalks to ca. 1 cm. long, the inflorescence rather narrow and elongate, simple or few-branched.

Flowers: Sepals joined into a tube, this asymmetrical, narrowly oblong, spreading at orifice, about 12-ribbed, in flower 7-8 mm long, strongly maroon-tinted, the orifice 6-toothed, the surface bristly hairy with a mixture of spreading, broad-based, purplish, glandular hairs and appressed glandless white hairs. Petals mostly 6, spreading, unequal, the longest, 8-10 mm long, narrowly spatulate, smooth, pink, or white, thus the flowers in full bloom showy, phlox-like. Stamens about 12, unequal, attached to upper part of calyx tube below the teeth, mostly included or the longer ones slightly protruding from calyx mouth. Fruiting calyx irregularly narrowly urn-shaped, the body base oblique with the upper part produced into a pouch, the body necked, then flaring into a broadly funnelform, triangular-toothed limb.

Fruit: Capsule enclosed in the calyx, 3.5-4.5 mm long.

Distribution and Flowering Season

In pine flatwoods savannas of northwest Florida. Flowering mostly in June and July.

Habitats and Management Implication

Cuphea aspera is yet another of the numerous yet rare Florida endemic species discovered or described by Dr. Chapman. It is often mingled with or near other rarities such as Verbesina chapmanii, Scutellaria floridana, Macbridea alba. Optimal habitat is savanna, with a moist black sandy peat

over gley which never dries out, and a herbaceous association that is primarily grass-sedge with a scattering of wax myrtle, gallberry, heaths, palmetto in the shrub layer and an overstory scattering of longleaf and slash pine. Fire has unquestionably had a bearing on maintenance of this species, which is a cormophyte that rapidly responds to burning by production of flowering shoots. Removal of fire promotes expansion of grass genera such as Aristida, Andropogon, Panicum, as well as shrubs so that such forbs as this are crowded out, or shaded out. The species must not be shade tolerant in that it is not found in heavy stands of pine or in shrub thickets. Thus clear-cutting would probably not affect it adversely. Site preparation of any sort that would disturb the soil of an entire block would not be advisable. Bedding would be acceptable were the beds wide apart enough to admit sufficient light to the undisturbed strips; however any plantation that would have complete crown closure would eliminate this species. Most collections of C. aspera are old, most show plant bases charred by fire. This could indicate that the plant is now not as frequent as once it was, and probably because of better fire protection within the area.

#### References

Small, J. K. 1933. Manual of the Southeastern Flora, pp. 931-932.

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Revised March 1980

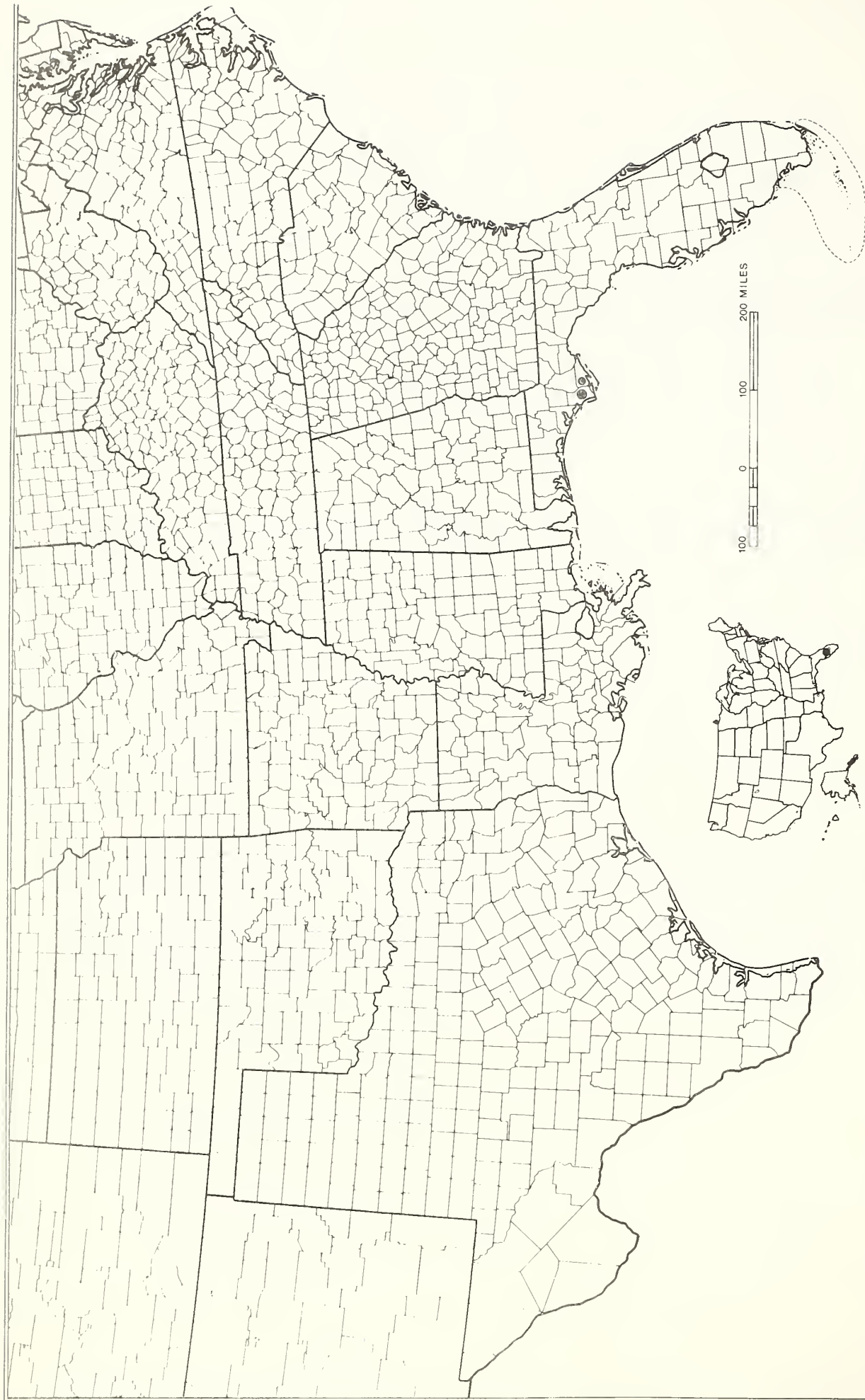
SPECIES: #143 Cuphea aspera Chapm.; Tropical waxweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	X
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 143. *CUPHEA ASPERA*

MELASTOMATACEAE

Rhexia parviflora Chapm.; Small-flowered meadowbeauty

Technical Description

Perennial from short, slender rhizomes.

Stems.--One to few, erect, to 4 dm tall, the lower part somewhat woody, pale brown, 4-angled, at mid-stem definitely angled and with low wings, the stem faces nearly equal, sparsely hairy to smooth save at nodes.

Leaves.--Larger leaves broadly ovate to elliptic, to 3 cm long, on petioles to 0.5 cm long, sparsely appressed-hairy, the apex and base acute, the margin serrulate, the teeth ascending, hair-tipped. Basal leaves usually the broadest, these sometimes nearly round, thence grading gradually upward into narrower, but longer blades, then into bracteal leaves.

Inflorescence.--Flowers in small, symmetrical cymes. Bracts of inflorescence similar to stem leaves, but somewhat smaller, giving it a leafy look.

Flowers.--Mature hypanthium (calyx tube) 5-7 mm long, the body nearly round, the neck short-cylindrical, shorter than the body, with a few hairs toward its tip; sepal lobes ca. 2 mm long, triangular-acuminate, spreading. Petals asymmetrical, suborbicular to broadly obovate, to 1.3 cm long but usually closer to 1 cm long, white, smooth, the mid-vein projecting as a short, slender hair. Stamens projecting beyond the spreading corolla and crowded toward its base, the anthers 3.0-3.5 mm long, linear-oblong, but slightly curved, dehiscing by apical pores.

Fruit.--Capsule smooth, nearly round. Seeds ca. 0.6 mm long, like small snailshells, crested with irregular, roughly concentric, interrupted lines of laterally flattened, dome-shaped processes.

Distribution and Flowering Season

In clearings or light shade, low places, in Franklin (perhaps also Liberty) County, Florida. Flowering from July through September.

Special Identifying Features

This species most closely resembles R. mariana, particularly the white-petaled forms, but has shorter rhizomes, smoother stems, broader leaves. Also, its stem faces are subequal, while those of R. mariana have one pair of stem faces narrower and concave in contrast to the convex and broader other pair. Its anthers are the shortest of its complex, thus in this regard border in character on those of R. petiolata, R. nuttallii, two dwarf, pink-petaled Coastal Plain species.

Habitats and Management Implication

R. parviflora is on wet, high peat content sands, usually on the edges of Hypericum-Ilex-tupelo-pond cypress ponds or on the edge of ti-ti swamps.

Usually it is a part of grass-sedge communities and is probably maintained through removal of shrub and tree competition through periodic naturally occurring fire. Its habitats are sporadic in a prevalently slash or long-leaf pine-saw palmetto-gallberry type. Selective logging in its area probably affects it little, or may even produce additional habitat. On the other hand, site preparation involving digging of drainage ditches or this in combination with bulldozing or other removal of the woody plant and herbaceous ground cover together with the top soil would eliminate this species. It is uncommon even within its known range and care should be taken to preserve its habitat intact.

#### Suggested Reading

James, C. W.

1956. 8:201-230. A revision of Rhexia (Melastomataceae). Brittonia

Kral, R., and P. E. Bostick.

(6):387-440. The genus Rhexia (Melastomataceae). Sida 3

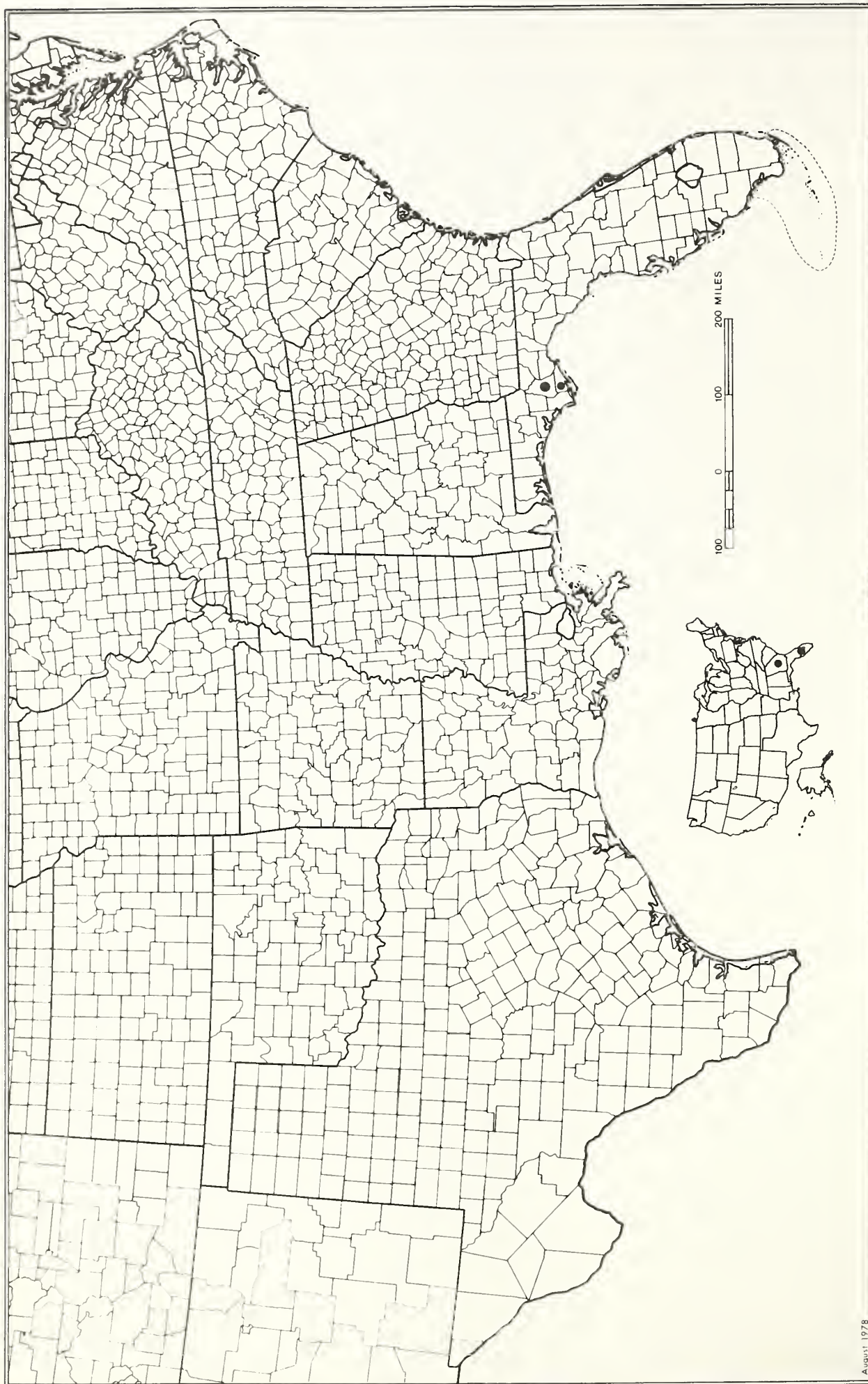
SPECIES: #145 Rhexia parviflora Chapm.; small-flowered meadowbeauty

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		X	X	X			X	
Damage								
No lasting effect								
Beneficial if done properly	X				X	X		

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980



MAP 145. *RHEXIA PARVIFLORA*

POACEAE

Calamovilfa arcuata K. E. Rogers; Cumberland reedgrass

Technical Description

Perennial grass. Culms mostly 8-15 dm. tall, few to several to a clump, arising from ascending, thickish, fibrous-scaley rhizomes. Culms terete, slender, erect or ascending, somewhat nodding toward the summit.

Leaves: Ascending, pale-green, rather firm, to 50 cm. long; sheathes firm, pale yellow-green, open toward the summit, the narrow margins long-ciliate, the backs loosely pilose, the short ligule and the collar pilose with pale long hairs; blades linear, ascending, about 5 mm. broad, tapering very gradually to very slender, angulate tips, many-nerved, the edges harsh, the inner faces toward the ligules pilose. Leaves diminishing in size upward on the culms, somewhat hairier, the uppermost blade exceeded by the inflorescence.

Inflorescence: Spikelets in erect to somewhat nodding reddish-purple panicles, the primary branches scattered or nearly whorled, the axils pilose, the axes flexuous, the spikelets themselves tending to be crowded toward the apices of the branches and branchlets. Stalks of spikelets various in length, from 2 mm. up to 1 cm. Spikelets mostly 6-7 mm. long, lanceolate, reddish-purple, the first glume lanceolate, 1-nerved, slenderly acuminate, about 3 mm. long, the second glume similar but with a longer, more slender tip, about 5 mm. long; the margin thin, entire.

Florets: Floret base with callus pilose with long, pale hairs, the lemma narrowly lanceolate, about 6 mm. long, the apex slenderly acuminate, arched outward, the margins somewhat inrolled particularly toward the slender tip, the back somewhat keeled, and scattered pilose toward the base; palea 4-4.5 mm. long, lanceolate, acute or short-acuminate, the back furrowed and 2-nerved toward the base, hairy between and on the nerves. Stamens 3 mm. long.

Distribution and Flowering Season

Organic gravel and sand of bars and banks of streams, locally abundant along Daddy's Creek in the Cumberlands of Tennessee; Pushmataha County, in southeastern Oklahoma. Flowering in August, September.

Special Identifying Features

A quick glance at the tallish, slender, tufted plants with their panicles of purplish spikelets would make one think of the common grease-grass,

Triodia flava. Spikelet characteristics however, are clearly those of Calamovilfa. It is nearest C. brevipilis, a rare species of the Coastal Plain from New Jersey south to South Carolina but differs from it in its pilose (rather than glabrous) nodes and collar, its longer ligule, its hairier leaves, its pilose pulvinus, its longer spikelets and its arcuate (curvate) lemma tips.

#### Habitats and Management Implication

The habitat of this restricted species appears (at least in Tennessee) to be one of alluvial bars or banks of creeks. Daddy's Creek, the only known locality for it in Tennessee, is a swift, usually clear, rocky shallow Cumberland stream that flows through mixed hardwood, hemlock, yellow pine forest, its banks with dense growths of alder, dogwoods (mostly Cornus amomum), willow, Itea, Hypericum, Ilex verticillata, etc. The stream bedrock and boulders are mostly sandstone and in many places boulders, gravels and sands form bars which have stabilized and picked up finer alluvium. On these have formed rather dense growths of shrubs with the openings made up of mixed grasses (mainly Andropogon, Panicum) and sedges together with a scattering of composites. Here the Calamovilfa appears, the tufts solitary or numerous depending on the size of the small clearings in the brush. The substrate is always at least damp, is sandy and gravelly with a good admixture of organic material. The plants are probably maintained by periodic creation of new bars through stream action, together with the washing away of sufficient shrubby competition to create new openings. This is a grass of full sunlight, so that development of heavy shrub cover or overstory shades it out. Occasionally plants are found growing in chinks in boulders at midstream.

Management of the area this plant frequents would have to be such as to preserve the watershed intact. Heavy logging of same would result in a more erratic flooding pattern, longer periods of high water than the short periods these bar plants are accustomed to. The steep topography would lessen the usefulness of any logging activity save careful selection. The main threat, at least to the type locality, is in the extensive development of vacation community housing in that area (e.g. Fairfield Glade Community).

#### References

- Rogers, Ken E. 1970. A new species of Calamovilfa (Gramineae) from North America. *Rhodora* 72 (789): 72-80.
- Thieret, John W. 1966. Synopsis of the genus Calamivolf<sup>n</sup>a (Gramineae). *Castanea* 31: 145-152.

Revised March 1980

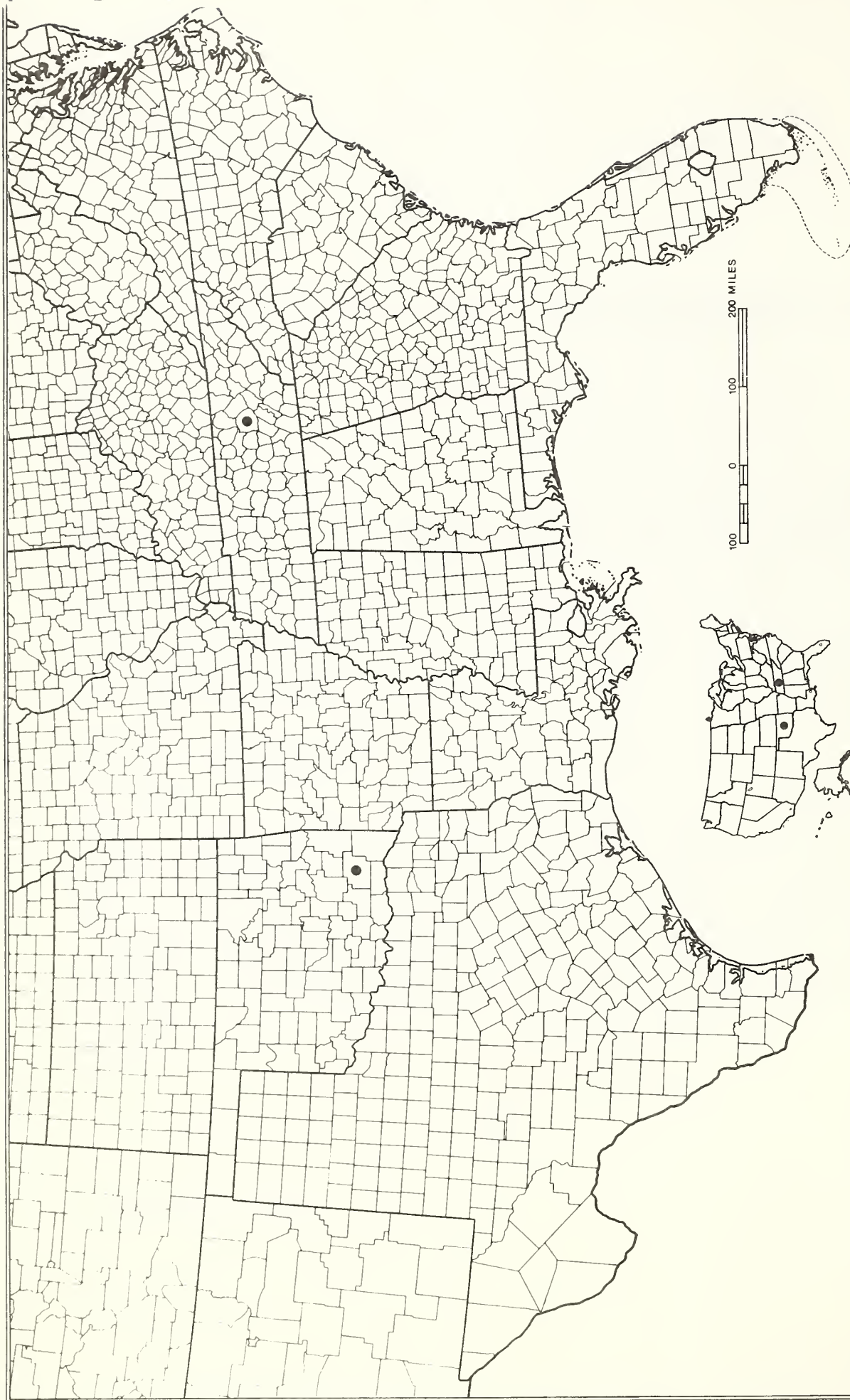
SPECIES: #146 Calamovilfa arcuata K. E. Rogers; Cumberland reedgrass

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy						X	X	X
Damage								
No Lasting Effect	NA	NA	NA	NA				
Beneficial if Done Properly					X			

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 146. CALAMOVILFA ARCUATA

POLEMONIACEAE

Phlox pulchra Wherry; Wherry's phlox

P. ovata L. var. pulchra Wherry

Technical Description

A perennial smooth herb with short, woody, rather slender rhizomes, and producing both sterile and flowering shoots.

Stems: Shoots mostly 3-6 dm long, erect from short, horizontally bent offshoots, round in cross section, greenish or with purplish tints toward the base, the sterile usually shorter than the flowering ones and often sprawling, remaining green over winter.

Leaves: Opposite, spreading or ascending, smallest and from close-set nodes at the plant base, becoming well separate up the stem (longest are largest toward shoot apex on sterile shoots), from linear to elliptic-linear or oblong or oblanceolate, to 6 cm long and 2 cm broad or slightly more, the blades sessile or on short, clasping-based petioles, narrowly acute or short-acuminate, entire, slightly revolute, the bases narrowly to broadly cuneate, rarely rounded.

Inflorescence: Leaves of flowering shoots reduced in length, the pairs widely separated toward the inflorescence, mostly of a narrowly ovate type. Inflorescence rather compact, a compound of a large terminal cyme and long, upwardly-arching-branched opposite lateral cymes, very showy.

Flowers: Short-stalked, sepals 5, 1.0-1.2 cm long fused below into a narrowly campanulate tube, the lobes linear-lanceolate, erect, acuminate, about 0.7-0.8 cm long, each with a strong, raised midnerve and thin pale margins: corolla trumpet shaped, (salverform) bright pink or white, 3.0-3.5 cm long, the limb spreading, about 2.0-2.5 cm broad, the lobes broadly obovate or suborbicular. Stamens 5, attached to corolla tube at different levels toward its orifice opening, with some anthers at least exerted beyond. Style elongate, the 3 linear stigma lobes projecting slightly beyond the corolla tube.

Fruit: A capsule, this largely enclosed by the persisting, finally spreading calyx.

Distribution and Flowering Season

Sporadic in upland woods and clearings, southwest end of the Appalachian Plateau, mostly north-central Alabama, with outliers in the inner Coastal Plain. Flowering mostly in May and June.

## Special Identifying Features

P. pulchra is very similar to P. ovata, a frequent plant in similar habitats to the northeast in the Appalachians, but differs from it in its longer sterile shoots, its more numerous leaf-bearing nodes, and in its shorter-petioled leaves. Wherry (1955) reports that some examples are pilose (hairy), but this is indeed rare.

## Habitats and Management Implication

This rare species is invariably in acidic situations, usually in open stands of oak-hickory-pine (the pine mostly shortleaf and loblolly, occasionally longleaf) or in oak-hickory, as a rule associated with a shrub understory of heaths (Vaccinium, Lyonia, Gaylussacia, Osydendrum, Epigaea) on well-drained uplands. The soils it is on are usually sandy loams or sandy-clay-loams. It is usually either in thin shade or in small clearings in the forest, its lively pink-flowered forms visible from a distance.

In its Alabama habitat it is most frequent in areas that have been subjected both to considerable logging and also to fire, an indication that it does not decrease with disturbance of this sort. Site preparation involving removal of vegetation through raking, chaining, bulldozing or other mechanical disturbance of the sort that would remove all vegetation preparatory to plantation of pine of course eliminates the species. I have seen no instances of its seeding in to such areas, and no evidence of it either in pine plantations or in grazed woodlands.

## References

Wherry, Edgar T. 1955. The Genus Phlox. Morris Arboretum Monographs III. Philadelphia.

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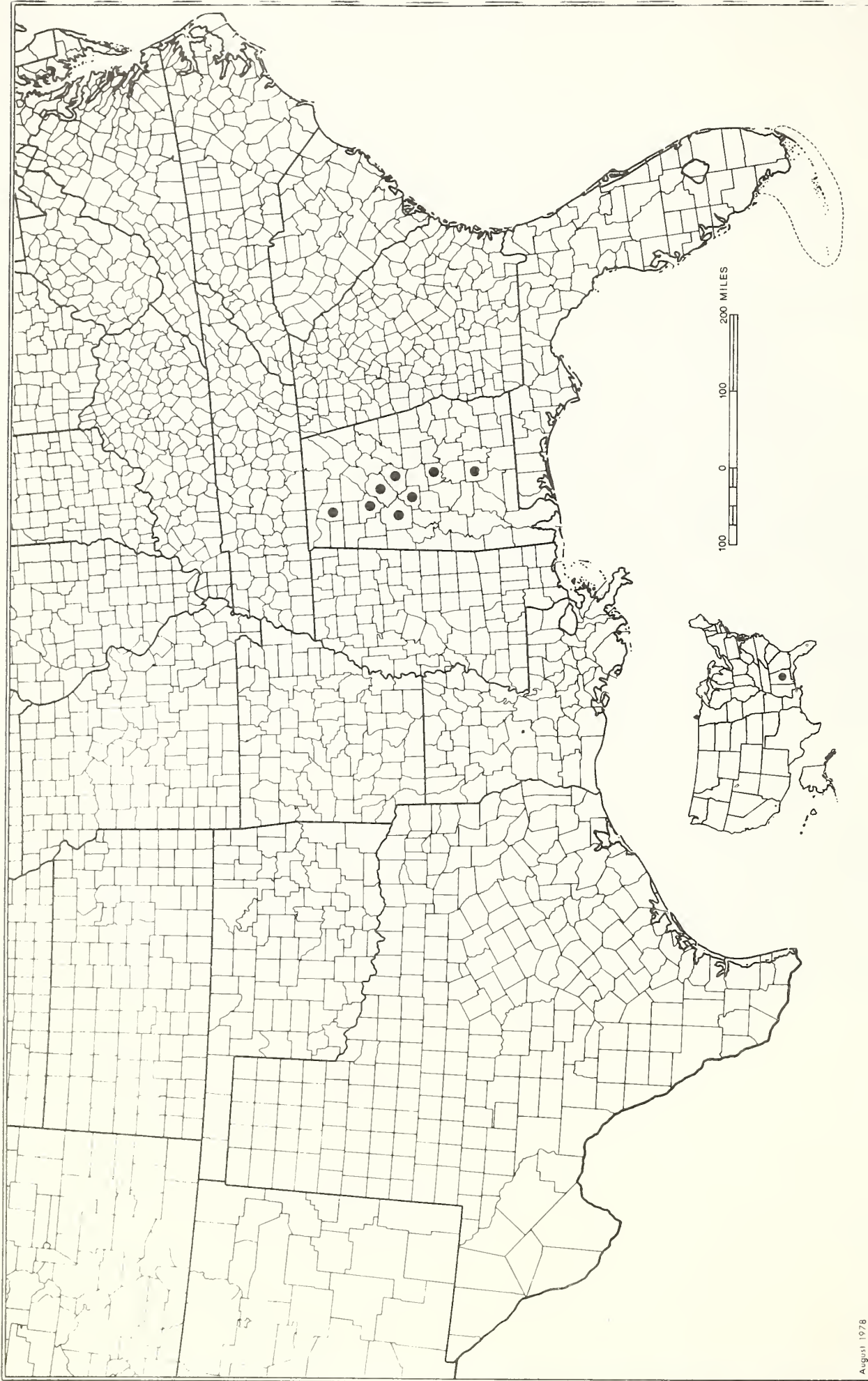
SPECIES: #147 Phlox pulchra Wherry; Wherry's phlox

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 147. PHLOX PULCHRA

POLYGONACEAE

Polygonella ciliata Meisn. in DC. var. basiramia (Small) Horton;  
Hairy jointweed

Delopyrum basiramia Small

Technical Description

Taprooted annual.

Stems: Several (up to 20) arching-based but erect or ascending, sparingly-branched, narrow (rarely more than 2 mm broad), wiry, round, but low-fluted, to 8 dm long, because of tabular-sheathing stipules appearing jointed, toward the bases reddish-brown, upward reddish brown in the bristly-ciliar stipular area (the ocrea) and with internodes greenish, the stem surfaces smooth or with minute (visible with 10X hand lens as white flecks) stellate hairs.

Leaves: Basal leaf blades absent at flowering time, those of mid-stem and branches filiform or slightly dilated upward, to 2 cm long (usually shorter), ascending, weakly spine-tipped or sharp-tipped, smooth.

Inflorescence: A narrow, ascending-branched system of slender racemes, these mostly 3 cm or less long, made up of numerous, overlapping, small, bristly tipped ocreae (ocreae) from each of which protrude slender, short, pale flower stalks.

Flowers: Small, the lowest opening first, about 1.5 mm long, the perianth (usually of 5 unequal sepals) members oblong or obovate, flat, joined toward the base, chalk white, slightly spreading. Stamens usually 5, attached at ovary base, some with broadened filament bases, the anthers projecting slightly beyond the sepals, round, blackish. Ovary superior, 3-angled, pale, elliptic, bearing a small tuft of glandular hairs (the stigmatic area) at its apex.

Fruit: A trigonous, reddish-brown akene about 1 mm long, this loosely enclosed in the reflexed fruiting calyx, and its beak projecting beyond.

Distribution and Flowering Season

This variety is restricted to 2 counties in the southernmost part of the Florida Highlands, and is locally frequent on the pure, whitish sands of old dunes. It blooms in fall, fruits in late fall and winter.

Special Identifying Features

It is most similar in appearance to two other wiry-stemmed Polygonellas, P. ciliata var. ciliata of more general distribution in peninsular Florida and P. gracilis (Nutt.) Meisn., which is on sandy soils in the southeastern U. S. Coastal Plain. From the former it differs in its many-stemmed habit (P. ciliata var. ciliata usually produces but 1 strong shoot from the taproot) and from the latter, which is simple stemmed, it differs in having fringed ocreae.

## Habitats and Management Implication

P. ciliata var. basiramea is found in clearings in the Sand Pine-ever-green scrub oak type. The main overstory species are themselves low, mostly Sand Pine and Florida Hickory, with an admixture of Ilex, Osmanthus, Quercus myrtifolia, Q. chapmanii, Q. maritima, and an understory consisting of various sclerophyllic shrubs, including Ceratiola, some other polygonellas, shrubby compositae such as Garberia, and Bumelia, palmetto, etc. Herbaceous components such as this plant are generally on sandy clearings, often lichenous and with Selaginella. Common genera would be Andropogon, Aristida, various compositae, pinweeds, sand spurrys, Euphorbia. Several species of threatened or endangered plants are here, and all appear to be plants of sandy clearings in old dunes. In the past these same areas have been swept by fires, this revealing the almost pure sand, this in turn subject to wind action. The forest has always been of a marginal sort, producing scrubby oaks, hickories, pines. The areas have more fire protection now so that clear cutting and brushing would probably promote increase of the herbaceous species. So as well would site operations of the sort that would expose the sands without totally removing seed sources of the same herbs.

The greatest enemy is the rapid conversion of such scrub lands either to massive housing and other real estate development, together with the greatest hazard of all, the orange grove. Few of the endangered species mentioned above are found in the well maintained orange groves which now cover most of what was the South Florida highland scrub.

## References

- Horton, J. H. 1963. A taxnomic revision of Polygenella (Polygonaceae). Brittonia 15: 177-203.
- Small, J. K. 1924. Plant novelties from Florida. Bull. Torr. Bot. Club 51: 379-393.

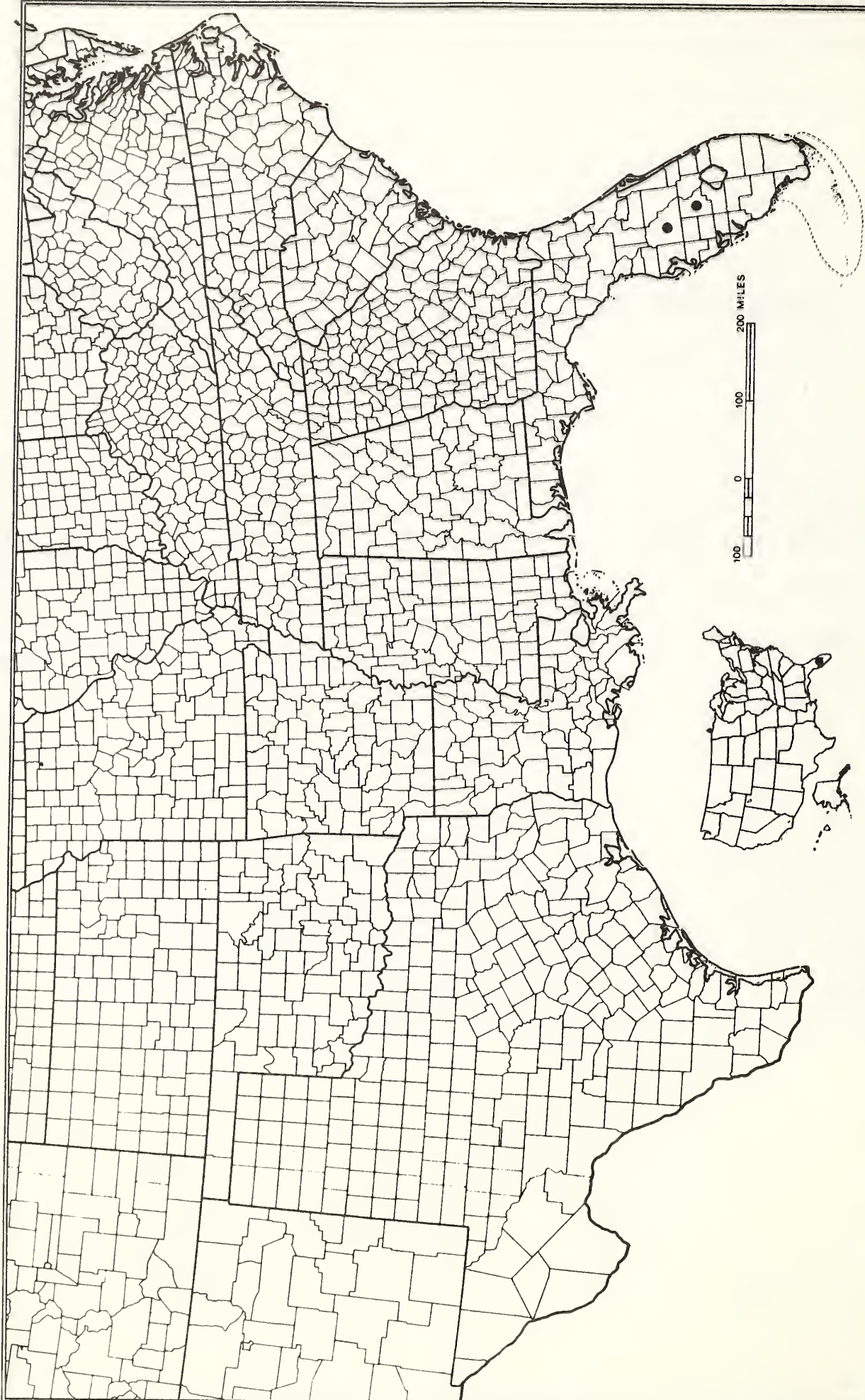
#148 Polygonella ciliata Meisn. in DC. var. basiramae (Small Horton;  
SPECIES: Hairy jointweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect								
Beneficial if Done Properly	(NA) X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 148. *POLYGONELLA CILIATA BASIRAMEA*

POLYGONACEAE

Polygonella myriophylla (Small) Horton; Small's jointweed

Dentoceras myriophylla Small

Technical Description

A sprawling, mat-forming shrub.

Stems: The many elongate branches frequently rooting at lower nodes, and issuing from a deep, essentially taprooted stock. Shoots mostly slender, zig-zag, the lower bark reddish-brown, cracking and partly separating in long, flat, interlacing strips; mid and upper shoot parts with bark paler reddish brown, the branchlets greenish. Lowest branches of main shoots erect, slender, zig-zag, with the rather close nodes producing short, upright and leafy lateral branches and the uppermost branches of these main shoots terminating in narrow systems of racemes.

Leaves: Lineal, spatulate or clavate, fleshy, somewhat broadened, slightly flattened and definitely thin-edged at the very tips, mostly 3-10 mm long, smooth. Ocreae and ocreolae (stipules), fringeless, unequally cup-shaped, the longest part of the cup rim produced into 3 low broad thin teeth.

Inflorescence: Flowers in racemes, these short, several on spreading-ascending stalks toward the tips of the longer shoots, the total inflorescence a loose cylinder. Ocreolae of racemes similar to the stem ocreae, but overlapping and toothier, scarious. Racemes roundish or short-oblong, rarely 2 cm long, in bud narrower with the flower stalks concealed by the ocreolae and the outer sepals hood-like.

Flowers: In bloom projecting on pale stalks to 3 mm long, symmetrical, the sepals ascending, spreading as the fruit forms. Sepals 5, the outer 3 broadest, usually oblong or obovate, 3-4 mm long white with a green strip medially, the inner narrower, all wavy-margined and blunt-tipped. Stamens usually 5, the filaments white, with broad, flat bases, narrowing upwardly and slightly projecting the reddish round anthers beyond the sepal tips. Ovary 3-angled, elliptic, the narrow tip producing 3 slightly spreading style branches, each terminating in a stigma button.

Fruit: Akene reddish-brown, smooth, trigonous, about 3-3.5 mm long, its acute beak slightly projecting beyond or equalling the tips of the longer sepals.

Distribution and Flowering Season

P. myriophylla is restricted to the sandy scrub of the southern part of the Florida Highlands, where it blooms and fruits intermittently all year.

Special Identifying Features

It is part of that complex which has no ciliae (bristles) on the edges of its ocreae (stipules) and which has rather long style branches. In appearance it is closest to P. americana, which is found on sandy open

soils through most of the lower South, but not in Florida. However its very low, dense mats of shoots and leaves, shorter inflorescences with more ocreae/unit length distinguish it from that species which is erect, has longer inflorescences, larger flowers, a more strongly winged fruiting calyx, and narrower leaves.

#### Habitats and Management Implication

This rare species is in the same situations as P. macrophylla (which see) and is subjected to the same environmental stresses and dangers. It has become quite rare because of the increase of real estate development and of orange groves within its former range.

#### References

Small, J. K. 1933. Manual of the Southeastern Flora, p. 450.

Horton, J. H. 1963. A Taxonomic Revision of Polygonella Polygonaceae. Brittonia 15: 177-203.

Revised March 1980

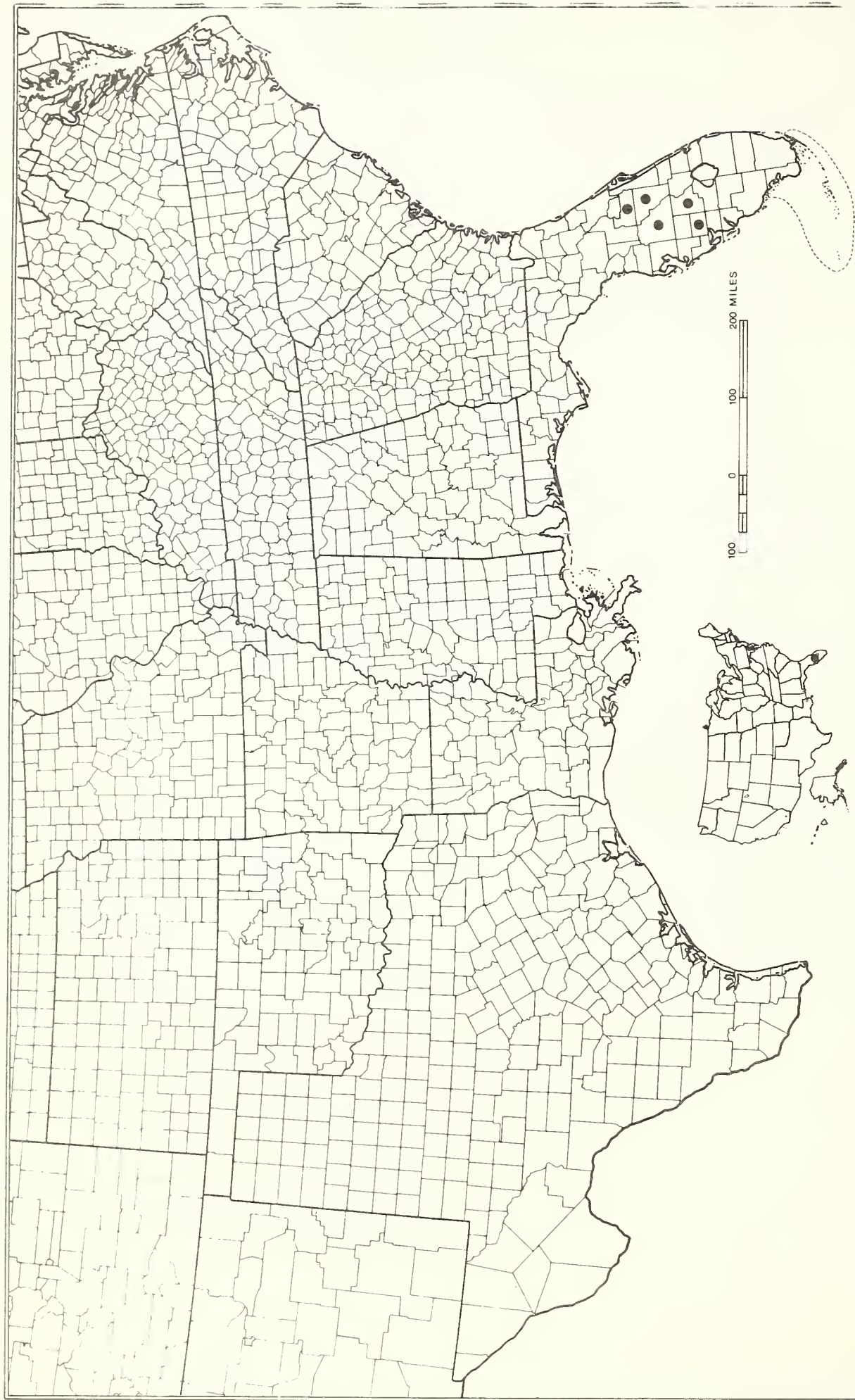
SPECIES: #150 Polygonella myriophylla (Small) Horton; Small's jointweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage	X		NA					
No Lasting Effect								?
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 150. *POLYGONELLA MYRIOPHYLLA*





# THE RED-COCKADED WOODPECKER: NOTES ON LIFE HISTORY AND MANAGEMENT

By  
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## INTRODUCTION

The red-cockaded woodpecker was once a common bird in the mature pine forests of the Southeast. It lived from east Texas to Florida and north to Missouri, Kentucky and Maryland. Today, its range and population have been reduced through loss of habitat.

Unlike other woodpeckers, the red-cockaded roosts in cavities in live southern pines. It needs older pine trees for its cavities, and extensive pine and pine-hardwood forests to meet its foraging requirements. Much of the South has been cleared for agriculture or other incompatible uses. Much of the remaining pine forests are not suitable for the red-cockaded. Each year, more areas become unsuitable. Because of the drastic loss and continued decline of habitat, the bird is considered in danger of extinction.

In 1970, the red-cockaded was declared an endangered species. It now has the same protection given the better-known bald eagle and whooping crane. But protection alone is not enough. On Federal and State lands, forestry practices are giving the bird a better chance for survival by creating a favorable habitat. Other landowners can take positive steps to enhance its survival, especially if the red-cockaded already lives on their land. This publication describes the needs of the red-cockaded and outlines steps to aid the bird.

## DESCRIPTION

The red-cockaded is slightly larger than a bluebird, about  $7\frac{1}{4}$  inches (18.3 cm) long (figure 1). The back and top of the head are black. Numerous, small white spots arranged in horizontal rows on the back give a ladder-back appearance. The cheek is white. The chest is dull white with small black spots on the side. Males and females look almost alike, except males have a small red streak above the cheek. The red streak is rarely seen and then only with a powerful binocular in bright sunlight. Juvenile males have a small red patch on the very top of the head until fall.

All other southern woodpeckers of similar size have one or more of the following characteristics: conspicuous red on the head, a prominent white vertical streak on the back, a prominent white patch on the wing, or brown feathers.



## LIFE HISTORY

**Social Organization.** – Among woodpeckers, the red-cockaded has an advanced social system. These birds live in a group called a clan. The clan may have from two to nine birds, but there is never more than one breeding pair. Young birds frequently stay with their parents for several months. The other adults are usually males called helpers. Some clans have no helpers, but others have as many as three. The helpers are typically the sons of the breeding male and can be from 1 to 3 years old. Young birds hatched in the spring disappear from the clan throughout the year, but a male sometimes remains with the clan to become a helper. The helpers assist in incubating eggs, feeding young, making new cavities, and defending the clan's area from other red-cockaded woodpeckers. A breeding male may live for several years. When he dies, one of his helper sons may inherit the status of breeding male.

**The Colony.** – A clan nests and roosts in a group of cavity trees called a colony. The colony may have one or two cavity trees to more than 12, but it is used only by one clan (figure 2). Cavities are made in live pines. Typically, within any colony, some cavities are still under construction (figures 3-5), some are finished and in use (figures 6, 7), and some have been abandoned (figures 9-13). In most colonies, all the cavity trees are within a circle about 1,500 feet (457 m) wide. In some colonies, all the trees are within 300 feet (9 m), but in others they may be  $\frac{1}{2}$  mile (.8 km) apart.

Each clan member tries to have a cavity for roosting. Only one bird roosts in a cavity. Birds without cavities in live trees often roost in scars on pine trees, in crotches between limbs or in cavities in dead trees. Red-cockaded with cavities defend them from other red-cockaded and other animals. Only the red-cockaded typically makes cavities in live pines, but 11 other birds, 5 mammals, 2 reptiles, and bees are known to use the cavities. Some animals use the cavity after it is no longer suitable for the red-cockaded. But others compete vigorously with the red-cockaded for its cavity. Some of the major competitors are the bluebird, red-bellied woodpecker, red-headed woodpecker, pileated woodpecker, and flying squirrel.

**Nesting Behavior.** – The red-cockaded woodpecker nests between late April and July. Only the breeding male courts and mates with the female. The female usually lays two to four eggs in the breeding male's roost cavity. Clan members take turns incubating the eggs during the day, but the breeding male stays with the eggs at night. The eggs hatch in 10 to 12 days. Nestlings are fed by the breeding pair and helpers. Adults bring food to the nest from up to 700 yards (640 m) away. Young birds leave the nest in about 26 days. Adults continue to feed the young after they leave the nest, but less so as summer progresses.

**Feeding Behavior.** – The clan spends much of its time looking for food as it travels about its territory. Most of the searching is concentrated on the trunks and limbs of live pine trees. There the birds scale the bark and dig into dead limbs for spiders, ants, cockroaches, centipedes, and the eggs and larvae of various insects. Repeated feeding visits are sometimes made to lightning-struck pines that are infested with beetles. The birds also spend time on cypress and hardwoods. Near farmland, they will feed on corn earworms. On occasion, they will eat fruits such as blueberry, sweetbay magnolia, wild cherry, poison ivy, and wax myrtle. They drink water from flooded holes in trees and from the ground.

**The Territory.** – The clan defends year round a territory surrounding the colony. Territories range from less than 100 acres (40.5 ha) to more than 250 acres (101 ha). The total area used by a clan can be as large as 1,000 acres (404.7 ha). A clan tries to keep other red-cockaded woodpeckers out of its territory, but will frequently trespass on its neighbors' territories. Defense can be mild encounters between clans, but at times fighting erupts with two opposing birds grasping each other's beak and falling to the ground.

**Cavity Construction.** – The red-cockaded woodpecker is the only bird that makes nesting and roosting cavities in live southern pines. Most other woodpeckers select dead trees or dead parts of live trees to make their cavities. These other birds

generally make new cavities each year and many do so in less than 2 weeks. The red-cockaded takes months and even years to excavate a cavity. Compared to dead wood, the sapwood and heartwood of the living pine is indeed tough. The abundant resin or pitch flow that occurs once the sapwood is penetrated creates another barrier. Seldom is a cavity completed in 1 year and most take several years of work. Generally, clans have several cavities under construction at the same time with some closer to completion than others. Many cavities that are started are never completed. Once completed, a cavity is used for several years.


The most intensive work on cavities occurs in summer after the young leave the nest. A bird may spend an hour or more excavating. Although work occurs any time during the day, most is in the morning. As fall progresses the birds spend less time working on cavities, and work essentially stops in winter. Spring sees a renewed interest in cavity construction. At this time, some clans show more interest than others and some defer cavity work altogether until the young leave the nest. Most cavities are between 20 and 50 feet (6.1 and 15.2 m) above ground. A few have been found over 60 feet (18 m) and some as low as 4 feet (1.2 m). Generally, the cavity is below any live limbs. It is common to find a tree with several cavities, but the birds may not use all the cavities at a given time.

Before a cavity is completed it is called a start hole (figures 3-5). A start hole progresses from a thumbnail size area where the bark has been removed, to a tunnel 6 inches (15.2 cm) or more into the tree. The tunnel is excavated at an upward slope so the resin or pitch will drain from the hole. The heartwood doesn't have flowing resin. Once the birds have tunneled through the sapwood and into the heartwood a sufficient distance, they excavate downward forming a gourd-shaped chamber about 6 to 10 inches (15.2 to 25.4 cm) deep and 3 to 5 inches (7.6 to 12.7 cm) wide. A bird sometimes roosts in a start hole before the chamber is fully developed.

**Cavity Maintenance.** – Before the cavity is completed, the birds flake away the bark several feet above and below the cavity entrance. The smoother surface possibly makes it harder for snakes to reach the cavity. Scattered about the trunk near the cavity entrance, numerous small holes called resin wells are chipped through the bark (figures 5-8). Resin flow from these holes eventually coats the trunk with pitch. Birds regularly peck at resin wells to stimulate resin flow.

The cavity entrance would grow shut if the birds did not remove the growing tissue from around the hole. In time, the birds expose the sapwood for several inches around the entrance. This exposed area is called the plate (figure 7). Pitch from the plate and resin wells thoroughly coats the trunk. From a distance, the cavity tree looks like a candle






(figure 2). Some observers think these so-called candles help the woodpeckers find their cavities. Others think the conspicuous trees serve as a territorial warning to alien red-cockaded. Another theory is that the resin deters predators – especially rat snakes. In one study, captive snakes actively avoided fresh resin and it appeared to be poisonous to them.

As long as a clan uses a cavity tree, the birds continue to scale the bark, chip the bark at the edge of the resin wells and plate, and enlarge the plate. On trees actively used for roosting and nesting, the pitch is clear and sticky, the freshly chipped bark around the resin wells and plate is reddish and the plate is light-colored. Once the birds stop using the cavity tree, the resin dries to a gray color, the plate becomes dull and weathered, and the bark at the edge of the resin wells and plate appears the same brownish color as the rest of the trunk (figures 9-13).

## HABITAT REQUIREMENTS



**Cavity Tree.** – Red-cockaded woodpecker cavities have been found in longleaf, loblolly, shortleaf, pond, slash, pitch, and Virginia pines. Two cavities have been reported in cypress. Cavities are rarely found in trees as young as 30 to 40 years old and most cavity trees are twice that old. Studies from different parts of the South found the average cavity tree age ranged from 63 to 126 years for longleaf, 70 to 90 years for loblolly, 75 to 149 years for shortleaf, 62 to 130 years for pond and 70 years for slash pine.

The tree must have enough heartwood to contain the roosting chamber. A chamber in sapwood would fill with resin. Heartwood is quite hard, but a high percentage of cavities is found in pines infected with a heart rot fungus called red heart. This fungus weakens the heartwood and makes cavity excavation easier. Some cavity trees apparently do not have red heart, but these trees may have softer than

average heartwood. It is not certain if the red-cockaded needs red heart in order to make a cavity in the average pine.

**Colony Site.** – The colony site is the stand of trees containing and surrounding the cavity trees. A good colony site is a mature, park-like, pine stand with 50 to 80 square feet (4.6 to 7.4 m<sup>2</sup>) of basal area per acre (figure 2). Few or no hardwood trees should be above 15 feet (4.57m) high. When the hardwood mid-story grows to the level of the cavities a high rate of cavity abandonment occurs, leading eventually to loss of the colony. Likewise sapling pines growing near the cavity trees can also cause abandonment. A few widely scattered hardwood trees, and shrubs below 15 feet (4.6 m) do not harm the red-cockaded and are beneficial to other wildlife. However, hardwood understories rapidly grow into hardwood mid-stories unless control measures are taken.

An important function of the colony site is to provide a source of new cavity trees. Cavity trees are generally used for several years, but on the average, from 4 to 9 percent die each year. In addition, other cavities become unusable by the red-cockaded. The colony site should be at least 5 to 10 acres (2 to 4 ha) to ensure cavity trees for the future.

The red-cockaded does not always have the chance to select good colony sites. Some sites that appear normal to the inexperienced eye are actually close to being abandoned. In seeking trees suitable for excavation, the bird often uses relict trees that were left as seed trees, or as culls, or to mark property boundaries. Often, such sites lack a supply of future cavity trees. At other sites, the uncontrolled hardwoods rapidly crowd out the birds.

**Foraging Habitat.** – The best colony site is no good if an adequate foraging habitat is unavailable. Good foraging habitat consists of pine stands with trees 9 inches (22.9 cm) and larger in diameter at breast height (d.b.h.). The red-cockaded also forages in pole stands (4 to 9 inches d.b.h.), but little use is made of sapling stands (less than 4 inches d.b.h.). Clans regularly forage on pines scattered through hardwood stands, but pure hardwood stands are of little value to the woodpecker. The acreage of foraging habitat needed by a clan varies with the quality of the habitat. While 100 acres (40.5 ha) of mature pine is sufficient for some clans, where habitat conditions are not ideal, clans commonly forage over several hundred acres.

Clans sometimes continue to use a colony site when their territory has less than 100 acres (40.5 ha) of suitable foraging area. But, study suggests these clans have considerable difficulty raising young. It is not uncommon to find abandoned colonies surrounded by a lack of adequate foraging habitat. Control of mid-story hardwoods is essential in colony sites, but the red-cockaded commonly forages in pine stands with a well-developed hardwood mid-story.



Active cavity with plate and resin wells.

## RED-COCKADED HABITAT

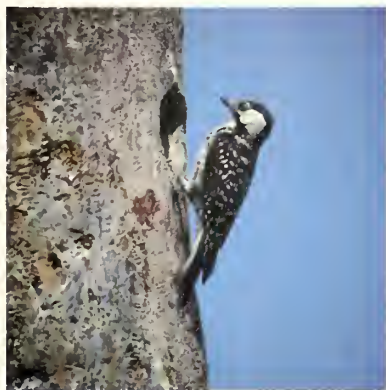


Figure 1.-Red cockaded woodpecker.

Red-cockaded cavities are made in live pines. Figures 1-17 show live pines. Cavity trees in open, mature pine stands are preferred (figure 2), but pine seed trees and relict pines in young stands are commonly used. In pine stands with hardwood midstories, active cavities tend to occur above the hardwood crowns and where hardwoods are sparsest. Hardwoods near the cavity typically lead to abandonment.



Figure 2.-Colony site. Note other cavity in center background.

## CAVITIES UNDER CONSTRUCTION

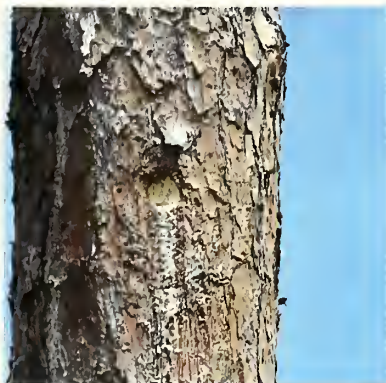


Figure 3.-New start hole. Note 1-inch wide round hole and scaling.

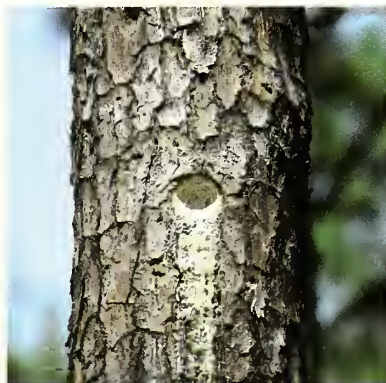


Figure 4.-Advanced start hole, 2 inches wide. Note round hole, symmetrical excavation into sapwood and resin icicle.



Figure 5.-Cavity nearly completed. Note resin wells and icicle.

## ACTIVE RED-COCKADED CAVITIES



Figure 6.-Cavity 2 inches wide with numerous resin wells.



Figure 7.-Cavity 2 inches wide with plate and resin wells.

## ACTIVE RESIN WELLS



Figure 8.-Close-up of resin well, 1-inch wide. Note red bark of active resin well.

Red bark on the edge of recently chipped resin wells and plate is a reliable sign a cavity is active (figures 5-8). A binocular is helpful. Caution: Look at the bark and not the resin - old resin sometimes looks red (figures 9, 10).

## ABANDONED TREES

Abandoned cavity trees are clues active trees might be nearby. Resin dries and grays on abandoned trees. Bark at the edge of resin wells and plate turns brown or is hidden by dry resin. Red-cockaded woodpeckers rarely roost in abandoned cavities. Active and abandoned holes can occur on the same tree.



Figure 9.-Inactive start hole. Note dull sapwood and symmetrical hole. Red color is dried resin.



Figure 10.-Abandoned cavity. White resin covers resin wells and plate.

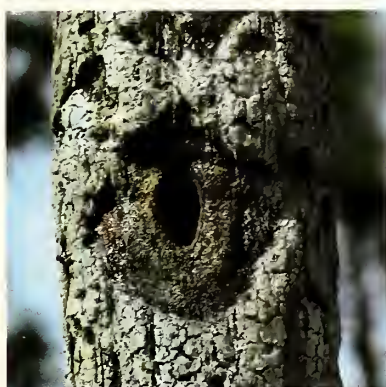


Figure 11.-Abandoned cavity. Note dull bark on resin wells and edge of plate. Reddish color on plate is dried resin.



Figure 12.-Enlarged cavity 5 inches wide. Note extensive coverage of old resin.



Figure 13.-Enlarged cavity 5x8 inches. Note old plate and resin wells.



Figure 14.-Yellow-bellied sapsucker holes 1/4-inch wide.

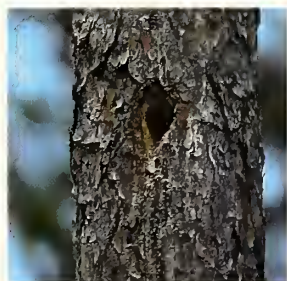


Figure 15.-Asymmetric feeding hole of pileated woodpecker.



Figure 16.-Branch hole. Note lack of icicle.



Figure 17.-Asymmetric tree wound with sparse resin flow.

## MISTAKEN FOR RED-COCKADED

If a hole does not have one or more of the following it is likely not to have been made by a red-cockaded: symmetrical hole, scaling, icicle, resin wells, or plate. Look for positive signs of red-cockaded activity. Binoculars are often needed. Sapsucker holes are smaller and more regularly spaced than resin wells (figure 14). Pileated woodpecker feeding holes are generally asymmetric (figure 15) and, if they penetrate sapwood, are tapered and ragged. Resin flow is light and scattered compared to distinct icicle of start holes (figures 3-5). Pileated work is common in pine stands with dense hardwood cover. Branch holes lack an icicle (figure 16). Tree wounds are asymmetric (figure 17). **Caution:** Sapsucker holes sometimes occur on red-cockaded trees and red-cockaded can excavate cavities through branch holes. In both cases, positive sign of red-cockaded is present.

Nonetheless, the highest populations of the bird are on areas with active, prescribed burning programs for the control of hardwoods in pine stands. Also, territories tend to be smaller in areas with hardwood control.

## MANAGEMENT SUGGESTIONS<sup>1</sup>

**Governing Factors.** – The potential for managing privately-owned forests to provide a favorable habitat for the red-cockaded woodpecker depends on (1) goals of the owner (2) current condition and natural capabilities of the land (3) size of the forest (4) forest conditions on adjacent land (5) occurrence of the red-cockaded on the owner's land and adjacent lands.

Landowners who have a red-cockaded colony can do much to enhance its survival regardless of the size of their property. But, because the birds forage over large areas, forest conditions on adjacent land may ultimately determine the fate of a colony. On larger forests, particularly those 200 acres (80.9 ha) or bigger, the bird can be maintained with greater assurance. Each individual colony is important to the survival of the species, but large ownerships of several hundred or thousand acres have the potential of sustaining significant populations of this endangered species. Land that has little or no pine forests has little potential as a red-cockaded woodpecker habitat. On areas without red-cockaded woodpeckers, but with pine forests, improvement of the habitat may encourage the red-cockaded to move into the area.

**Objectives.** – A successful management plan for the red-cockaded woodpecker must do five things: (1) retain existing cavity trees (2) provide trees for new cavities (3) provide adequate foraging habitat (4) control hardwoods in the colony site (5) provide future colony sites.

**Colony Site.** – Defer harvesting of existing colony sites. If the colony is in a larger stand that will be harvested, designate an uncut 200-foot (61 m) buffer zone around each cavity tree. Leaving only the cavity trees is not adequate, as the buffer is needed to provide replacement cavity trees. Do not isolate colony sites from foraging stands of pole size and larger pines. The colony site should be surrounded by or directly adjacent to foraging stands.

Control of hardwoods in the colony site is vital. Do not allow hardwoods to exceed 15 feet (4.6 m) or so in height, especially within 50 feet (15.2 m) of cavity trees. In colony sites lacking past hardwood control, it may be necessary to remove hardwoods by cutting. Prescribe burning, when properly applied, is an effective means of controlling small hardwoods. When using fire, rake around the base of the cavity trees to remove litter and resin, otherwise the tree may catch fire and destroy the cavity.

Thin stands containing colony sites back to 50 to 80 square feet (4.6 to 7.4 m<sup>2</sup>) of basal area per acre. Leave the older trees for future cavity trees. Unless a safety hazard, do not remove dead or abandoned cavity trees as other animals may use them instead of the good cavity trees.

In colony sites infested with southern pine beetles, the infested trees, except cavity trees, may be cut and removed, burned or sprayed with an approved pesticide. Do not use pesticides (such as organophosphates) toxic to vertebrates.

**Foraging Areas.** – Manage the available acreage as a foraging habitat. Favor pine stands on suitable sites. Plant pines at a 10x10 foot or 12x12 foot (3x3 m or 3.7x3.7 m) spacing to aid rapid stand development. Birds continue to use seed tree areas for foraging until seed tree removal. Regeneration areas of 10 to 30 acres (4 to 12 ha) have less impact on the bird than larger ones. Avoid isolating colony sites from foraging areas when regenerating stands. Thinning of sapling and pole stands improves diameter growth and opens up stands to a condition more suitable to the woodpecker. Control hardwoods by prescribed burning.

**Rotation Age.** – In general, the longer the rotation age, the greater the opportunity the red-cockaded has to maintain existing colonies and to create new ones. The minimum rotation age necessary to provide an adequate number of cavity trees to sustain a viable population of Red-cockaded is not known. As a safe minimum, the National Recovery Team recommends 100-year rotations for longleaf and 80-year rotations for other pines. Some opportunity for cavity replacement is provided by shorter rotations of 80 years for longleaf and 70 years for other pines, but it is not certain if these rotations can supply an adequate number of cavity trees. When it is not feasible to have long rotations over the entire ownership, leaving small, scattered stands of older pines will benefit the bird.

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<sup>1</sup>The suggestions are based upon those recommended by the National Recovery Team for the Red-cockaded Woodpecker.

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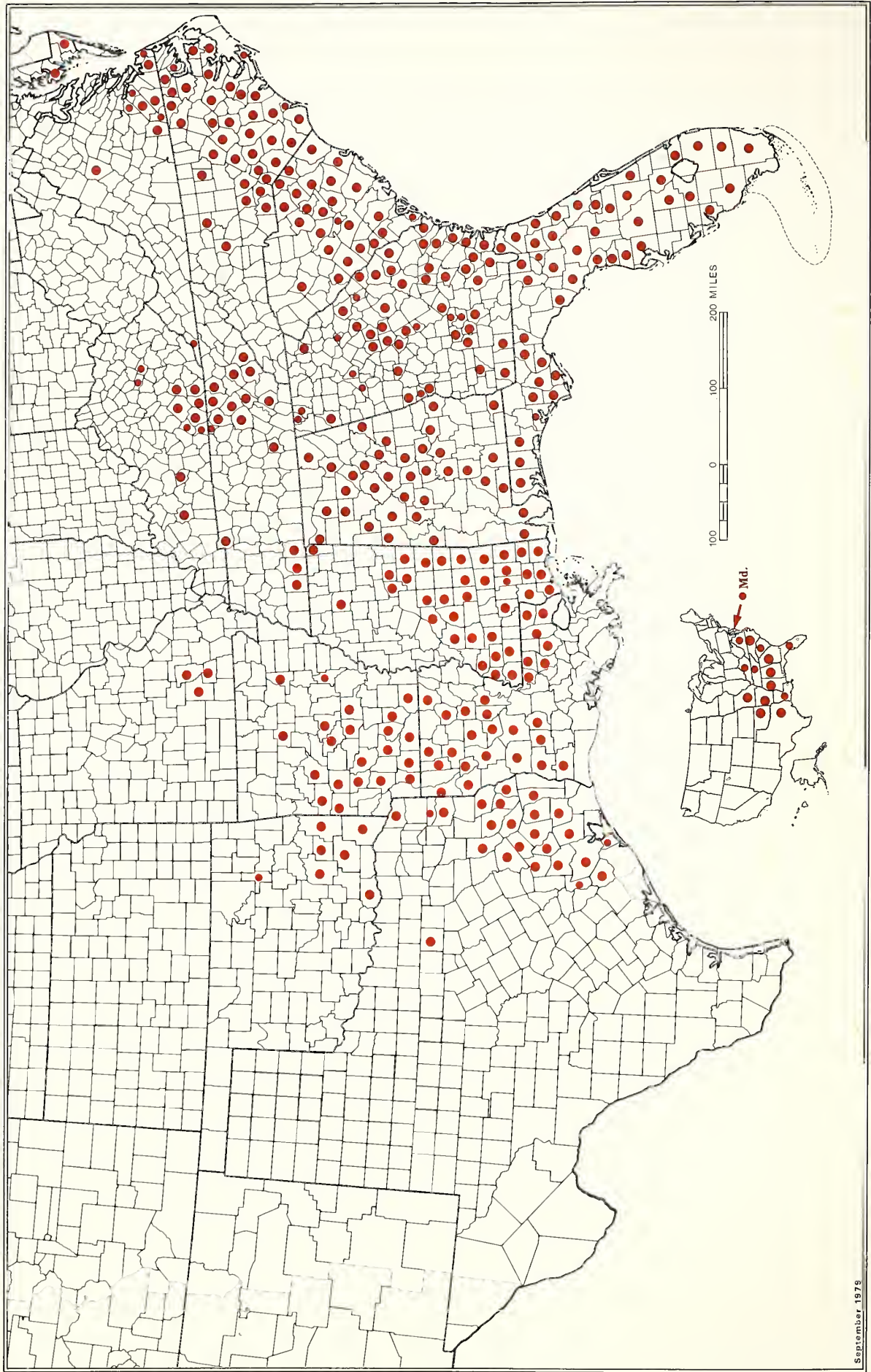
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*Historical distribution of red-cockaded woodpecker, by county and state.*











## GLOSSARY

- Acaulescent.--Stemless or apparently so, or with subterranean stem.
- Achene.--A dry, indehiscent, one-seeded fruit.
- Acorn.--The fruit of the oak consisting of a nut and its cup or cupule.
- Actinomorphic or actinomorphicous.--Capable of bisection through two or more planes into similar halves, as is a regular, radially symmetrical flower.
- Acuminate.--Tapering at the end of a gradual point.
- Acute.--Sharp, ending in a point, the sides of the apex essentially straight or slightly convex.
- Adnate.--Fusion of unlike structures.
- Adventitious.--Used of buds, roots, etc., which develop in an irregular or unusual position.
- Adventive.--Imperfectly naturalized.
- Aestival.--Appearing in summer.
- Aestivation.--The arrangement of the parts of the flower in the bud.
- Aggregate.--Crowded into a dense cluster, but not cohering.
- Albumen.--Nutritive tissue.
- Alternate.--Placed singly at different heights on the axis or stem.
- Ament.--A catkin, or dry scaly spike, usually unisexual, such as the inflorescence of willows, birches, etc., and at least the staminate inflorescence, in hickories and some other genera.
- Amplexicaul.--Clasping the stem.
- Anastomosing.--Connecting by cross-veins and forming a network.
- Ancipital.--Two-edged.
- Androecium.--A collective term for the stamens.
- Androgynous.--Composed of both staminate and pistillate flowers, the staminate at the apex.
- Annual.--Of only one year's duration. Winter-annual, a plant from autumn-sown seed which blooms and fruits the following spring.
- Anterior.--On the front side and away from the axis.
- Anther.--The pollen-bearing part of the stamen, borne at the top of the filament or sometimes sessile.
- Anthesis.--The expansion or the time of expansion of a flower.
- Apex.--The tip.
- Apical.--Relating to the apex or tip.
- Apiculate.--Ending in an abrupt, short-pointed tip.
- Appendage.--An attached extra or secondary part, as a projecting or a hanging part or supplement.
- Appressed.--Lying close and flat against.
- Aquatic.--Living in water.
- Areolate.--Marked out in small spaces; reticulate.
- Areole.--The open spaces formed by anastomosing veins.
- Aril.--An appendage growing at or about the hilum of a seed.
- Aristate.--Bearing a stiff bristle-like awn or appendage.
- Articulation.--The action or manner of jointing or interrelating.
- Ascending.--Rising somewhat obliquely, or curving upward.
- Ascending ovule.--One that is attached above the base of the ovary and is directed upward.

Asexual.--Sexless; without sex.  
 Attenuate.--Showing a long gradual taper.  
 Auricle.--An ear-shaped appendage or lobe.  
 Awl-shaped.--Tapering gradually upward from the base to a slender or rigid point.  
 Awn.--A bristle-shaped appendage.  
 Axile placentation.--Referring to the location of ovules at or along the central axis of the ovary.  
 Axillary.--In or related to the axis.  
 Axis (of the stem, inflorescence, etc.).--The central part of a longitudinal support on which organs or parts are arranged.  
 Barbed.--Bristles or awns provided with terminal or lateral spinelike hooks that are bent backwards sharply.  
 Barbellate.--Finely barbed.  
 Basifixed.--Attached at the base, as in an anther.  
 Beak.--A long, prominent, and firm point.  
 Beaked.--Ending in a firm, prolonged, slender tip.  
 Bearded.--Furnished with long or stiff hairs.  
 Berry.--Pulpy, indehiscent, few- or many-seeded fruit.  
 Biconvex.--Convex on both sides, as in a lens.  
 Biennial.--Of 2 years' duration.  
 Bifid.--Two-cleft.  
 Bilabiate.--Two-lipped.  
 Bilateral.--Arranged on opposite sides.  
 Bipinnate.--Doubly or twice pinnate.  
 Bipinnatifid.--Twice or doubly pinnatifid.  
 Bisexual.--Having both stamens and pistils.  
 Biterminate.--Twice ternate with three principal divisions, each with three leaflets.  
 Bladdery.--Inflated.  
 Blade.--The expanded part of a leaf or petal.  
 Bloom.--A whitish, powdery, and glaucous covering of the surface.  
 Bract.--A more or less modified or reduced leaf subtending a flower or belonging to an inflorescence, or sometimes on the stem.  
 Bractlet.--Bract borne on a secondary axis as on the pedicel or on the petiole.  
 Branchlet.--Ultimate divisions of a branch.  
 Bristle.--A stiff hair, or any slender body which may be likened to a hog's bristle.  
 Bristly.--Provided with bristles.  
 Bud.--The rudimentary state of a stem or branch; an unexpanded flower.  
 Bulb.--A subterranean leaf-bud with fleshy scales or coats.  
 Bulblet.--Little bulbs produced in the leaf-axils, inflorescence or other areas.  
 Bush.--A low thick shrub, without distinct trunk.  
 Caducous.--Falling off very early.  
 Calcareous.--Limey.  
 Callus.--A hard protuberance or callosity.  
 Calyx.--The outer circle of floral envelopes consisting of the sepals.  
 Calyx-tube.--The tube of a gamosepalous calyx.  
 Campanulate.--Bell-shaped or cup-shaped with a broadened rim.

Canescent.--Gray-pubescent and hoary.  
 Capillary.--Hairlike.  
 Capitate.--Shaped like a head; collected into a head or dense cluster.  
 Capsule.--A dry, dehiscent fruit composed of more than one carpel.  
 Carinate.--Keeled.  
 Carpel.--A simple pistil, or one member of a compound pistil.  
 Caryopsis.--A seedlike fruit with a thin pericarp adnate to the contained seed; a grain, as of grasses.  
 Castaneous.--Of a chestnut color; dark brown.  
 Catkin.--A scaly-bracted, usually nodding, flexuous spike or spikelike raceme with unisexual flowers.  
 Caudate.--Having a slender tail-like appendage.  
 Caulescent.--Having an evident stem above the ground.  
 Cauline.--Belonging to the stem.  
 Cespitose.--Growing in tufts; forming mats or turf.  
 Chaff.--A small, thin, dry and membranous scale or bract, particularly applied to the bracts in the flower-heads of composites.  
 Chartaceous.--Having the texture of writing paper.  
 Chlorophyll.--The green coloring matter within the cells of plants.  
 Cilia.--Marginal hairs.  
 Ciliate.--Fringed with hairs on the margin.  
 Cinereous.--Ash-colored.  
 Circumscissile.--Opening by a transverse circular line, the valve usually coming off as a lid.  
 Clasping.--Leaf partly or wholly surrounding stem.  
 Clavate.--Club-shaped; gradually thickened upward.  
 Claw.--The long narrowed base of the petals or sepals in some flowers.  
 Cleft.--Divided to or about the middle into divisions.  
 Cleistogamous.--Fertilized in the bud, without the opening of the flower.  
 Clone.--A group of individuals resulting from vegetative multiplication.  
 Column.--Body formed by union of filaments and style in orchards, or of filaments, as in mallows.  
 Columnar.--Column- or pillar-shaped.  
 Compound.--Composed of two or more similar parts united into one whole.  
 Compound leaf.--A leaf of two or more leaflets.  
 Conduplicate.--Folded together lengthwise.  
 Connate.--United or joined; in particular, used of like or similar structures joined as one body or organ.  
 Connective.--The filament or tissue connecting the two cells of an anther.  
 Convolute.--Rolled up longitudinally.  
 Cordate.--Heart-shaped with the point at the apex.  
 Coriaceous.--Of leathery texture.  
 Corm.--The enlarged solid, bulblike base of a stem.  
 Corolla.--Inner circle of floral envelopes of distinct or united petals.  
 Corona.--A crown or inner petal-like appendage.  
 Corymb.--Short and broad, more or less flat-topped flower-cluster with the outer flowers opening first.  
 Corymbose.--In corymbs or corymb-like.  
 Costate.--Having one or more longitudinal ribs or nerves.  
 Creeping.--Running along at or near the surface of the ground, and rooting.  
 Crenate.--Dentate with the teeth much rounded.

Crenulate.--Finely crenate.  
 Cryptogams.--A plant reproducing by means of spores and not producing flowers or seeds.  
 Culm.--The stem of grasses and sedges, usually hollow in the grasses except at the swollen nodes.  
 Cuneate.--Triangular, with the narrow end at point of attachment.  
 Cupule.--The cup (involucre) of the acorn.  
 Cuspidate.--Tipped with a sharp and firm point.  
 Cyathium.--A type of inflorescence in Euphorbia, consisting of a cuplike involucre bearing the flowers from its base.  
 Cycle.--Circle; used for the series of similar parts in a flower.  
 Cyme.--A broad more or less flat-topped flower-cluster with the central flowers opening first.  
 Cymose.--Bearing cymes, or cymelike.  
 Cystolith.--Usually thickenings of calcium carbonate in the epidermis of some plants.  
 Deciduous.--Falling, not persistent, as the leaves of non-evergreen plants.  
 Decomound.--More than once compound.  
 Decumbent.--Reclining or lying on the ground, but with the end ascending.  
 Decurrent.--Running down the stem from the point of insertion.  
 Decussate.--Opposite leaves in four rows up and down the stem.  
 Deflexed.--Bent or turned abruptly downward.  
 Dehiscence.--Method of opening of fruits, anthers, etc., at maturity.  
 Dehiscent.--Opening regularly by valves, slits, etc., as a capsule or anther.  
 Deliquescent.--Softening or wasting away, as in some perianths; also used of branching without a continuous main axis.  
 Deltoid.--Shaped like the Greek letter  $\Delta$ .  
 Dentate.--Toothlike, usually with the "teeth" directed downward.  
 Denticulate.--Minutely dentate.  
 Depauperate.--Impoverished, starved or stunted.  
 Depressed.--Somewhat flattened from above or pressed down.  
 Determinate.--An inflorescence with a terminal flower opening first and before those below.  
 Diadelphous (stamens).--Combined in two, often unequal, sets.  
 Diaphragm.--Dividing membrane or partition.  
 Dichotomous.--Forked in pairs.  
 Didymous.--Found in pairs.  
 Didynamous.--In two pairs of unequal length.  
 Diffuse.--Widely or loosely spreading.  
 Digitate.--Compound, with the principal parts arising together at the apex of the support, suggesting the fingers of the hand.  
 Dioecious.--Staminate and pistillate flowers on different plants.  
 Disk flowers.--In Compositae, the tubular flowers of the head as distinguished from the ray flowers.  
 Dissected.--Cut or divided into narrow segments.  
 Distichous.--In two vertical ranks.  
 Distinct.--Separate; not united with parts in the same series.  
 Divaricate.--Spreading rather far apart.  
 Divided.--Separated to the base.  
 Dorsal.--Relating to the back or outer surface of a part or organ.

Double.--Said of flowers that have more than the usual number of floral envelopes, particularly of petals.  
 Double-serrate.--Coarse teeth bearing smaller teeth on their margins.  
 Downy.--Covered with very short and fine, soft hairs.  
 Drupe.--A fleshy, one-seeded, indehiscent fruit with seed inclosed in a stony endocarp.  
 Drupelet.--One drupe in a fruit made up of aggregate drupes, as in the raspberry or blackberry.  
 Echinate.--Provided with prickles.  
 Ecotype.--Ecological variation more or less fixed to certain habitats.  
 Ellipsoid.--Solid with an elliptical outline.  
 Elliptic.--A flat part that is oval, narrowed to rounded at the ends and widest at or about the middle.  
 Emarginate.--With a shallow notch at the apex.  
 Embryo.--The plantlet in the seed.  
 Endemic.--Restricted geographically to a single area.  
 Endocarp.--The inner layer of a pericarp.  
 Endosperm.--The starch- and oil-containing part of many seeds; often referred to as the albumen.  
 Ensiform.--Sword-shaped.  
 Entire.--Without toothing, lobing, or division.  
 Epidermis.--The superficial layer of cells.  
 Epigynous.--Growing on the summit of the ovary.  
 Erose.--With the margin, as if gnawed.  
 Exocarp.--The outer layer of a pericarp.  
 Exserted.--Projecting beyond, as stamens from a corolla.  
 Exsiccated.--Dried.  
 Falcate.--Sickle-shaped; curved and flat, tapering gradually.  
 Farinaceous.--Containing starch, or starchlike materials.  
 Fasciated.--Much flattened by an abnormal widening and flattening of the stem.  
 Fascicle.--A condensed or close cluster.  
 Fastigiate.--Branches erect and more or less appressed.  
 Feather-veined.--With veins all arising from the sides of a midrib.  
 Feminine.--Pistillate.  
 Ferruginous.--Rust-colored.  
 Fertile.--Said of pollen-bearing stamens and seed-bearing fruits.  
 Fetid.--Having a disagreeable odor.  
 Fibrillose.--Furnished or abounding with fine fibers.  
 Fibrous.--Composed of, or resembling, fibers.  
 Filament.--The part of a stamen which supports the anther.  
 Filamentous.--Composed of threads.  
 Filiform.--Thread-shaped; long, slender, and terete.  
 Fimbriate.--Fringed.  
 Flabellate.--Fanlike.  
 Flexuous.--Curved alternately in opposite directions.  
 Floccose.--Covered with tufts of soft, woolly hairs.  
 Florets.--Individual flowers included within a very dense form of inflorescence.  
 Floricane.--The flowering cane, usually the second year's development of the primocane, in *Rubus* and similar genera.

Floriferous.--Flower-bearing.  
 Flower.--A structure bearing one or more pistils or one or more stamens or both; when only the former, it is a pistillate flower, when only the latter a staminate flower, when both are present it is a perfect flower. When the perfect flower is surrounded by a perianth represented by two floral envelopes (the inner envelope comprising the corolla, the outer the calyx), it is a complete flower.  
 Foliaceous.--Leaflike in texture or appearance.  
 Follicle.--Dry dehiscent fruit opening only on the ventral (front) suture and the product of a simple pistil.  
 Forked.--Divided into nearly equal branches.  
 Free.--Not joined to other organs.  
 Frond.--The expanded, leaflike portion of ferns and some other cryptogams; in Lemnaceae, etc., the thallus-like stem which functions as foliage.  
 Fruit.--The ripened ovary or seed-bearing organ with the adnate parts.  
 Fructification.--The act or organs of fruiting.  
 Fruticose.--Shrubby or shrublike in the sense of being woody.  
 Fulvous.--Tawny.  
 Funiculus.--Free stalk of an ovule or seed.  
 Funnelform.--With the tube gradually widening upward and passing into the limb.  
 Furrowed.--With longitudinal channels or grooves.  
 Fuscous.--Grayish-brown.  
 Fusiform.--Spindle-shaped; narrowed at each end from a swollen middle.  
 Gamopetalous.--Having the petals more or less united.  
 Gamosepalous.--Having the sepals united.  
 Geniculate.--Abruptly bent, like a knee.  
 Gibbous.--Swollen on one side, usually near the base.  
 Glabrate.--Nearly glabrous, or becoming glabrous with age.  
 Glabrous.--Not hairy.  
 Glade.--An open expanse of rocky strata occupied by herbaceous plants, but ordinarily lacking trees or large shrubs.  
 Glandular.--Having or bearing secreting organs, or glands.  
 Glandular-pubescent.--With glands and hairs intermixed.  
 Glaucous.--Covered with a "bloom" or a whitish substance that rubs off.  
 Glochid.--A minute, barbed hair or bristle.  
 Glomerate.--Compactly or densely clustered.  
 Glume.--A small, chafflike bract usually applied to one of the two empty bracts at the base of the spikelet of the grasses.  
 Glutinous.--Covered with a sticky exudation.  
 Granulose.--Covered by very small grains, or minutely mealy.  
 Gynandrous.--With the stamens borne on or adnate to the pistil.  
 Gynecandrous.--Having staminate and pistillate flowers in the same spike, the pistillate at the apex.  
 Gynoecium.--The pistil or collective pistils of a flower or the female portion of a flower as a whole.  
 Gynophore.--Stipe of an ovary prolonged within the calyx.  
 Habit.--The general appearance of a plant.  
 Habitat.--The kind of locality in which a plant grows.  
 Hastate.--Like an arrow-head, but with the basal lobes pointing outward at wide or nearly right angles.

Head.--A dense cluster of sessile flowers or fruits on a very short axis or receptacle.  
 Herb.--A plant without persistent woody stems or without a definite woody structure.  
 Herbaceous.--Having the characters of an herb; leaflike in color and texture.  
 Hermaphrodite.--With the stamens and pistils in the same flower.  
 Hilum.--In the seed the scar indicating the point of attachment to the funiculus.  
 Hirsute.--With rather stiff or coarse hairs.  
 Hirsutulous.--Slightly hirsute.  
 Hirtellous.--Minutely hirsute.  
 Hispid.--Provided with stiff or bristly hairs.  
 Hispidulous.--Minutely hispid.  
 Hoary.--With a fine, close grayish-white or whitish pubescence.  
 Holotype.--The specimen from which the original description was made.  
 Hyaline.--Transparent or translucent.  
 Hybrid.--A plant resulting from a cross between two parents that are unlike.  
 Hypanthium.--The cuplike "receptacle" produced usually by the fusion of floral envelopes and androecium and on which are seemingly borne calyx, corolla and stamens.  
 Hypogynous.--Situated on the receptacle beneath the ovary and free from it and from the calyx; having the petals and stamens so situated.  
 Imbricated or imbricate.--Overlapping, as shingles on a roof.  
 Immersed.--Growing wholly under water.  
 Incised.--Cut sharply, irregularly, and more or less deeply.  
 Included.--Not at all projecting from the surrounding envelope.  
 Indehiscent.--Not regularly opening by valves, etc.  
 Indeterminate.--An inflorescence whose terminal flowers open last.  
 Indigenous.--Native and original to the region.  
 Indusium.--The covering of the sorus or fruit-dot in ferns.  
 Inferior.--Lower or below; as an inferior ovary, one that is below the calyx.  
 Inflexed.--Turning abruptly or bent inward.  
 Inflorescence.--The flowering part of a plant, but especially the type of its arrangement.  
 Infundibuliform.--Funnel form.  
 Inserted.--Attached to or arising from.  
 Internode.--The portion of a stem or other structure between two nodes.  
 Interrupted.--Not continuous.  
 Introduced.--Brought intentionally from another region, as for purposes of cultivation.  
 Involucel.--A secondary involucre.  
 Involucral.--Pertaining to an involucre.  
 Involucre.--A circle or collection of small leaves or bracts surrounding a flower cluster or head or a simple flower, sometimes reduced to one encircling bract.  
 Involute.--Rolled inward.  
 Irregular.--Manifesting a difference in the size, form, or union of similar parts.  
 -ish.--Suffix signifying slightly or tending towards.

Jointed.--With nodes, or areas of real or apparent articulation.  
 Keeled.--Ridged like the bottom of a boat.  
 Labellum.--Lip, especially the lip of orchids.  
 Lacerate.--Irregularly cleft as if torn.  
 Laciniate.--Slashed into narrow, pointed lobes.  
 Lamina.--The blade or expanded portion of a leaf, petal, etc.  
 Lanate.--Woolly, with long, intertwined, curly hairs.  
 Lanceolate.--Shaped like a lancehead, several times longer than wide, broadest toward the base and narrowed to the apex.  
 Lateral.--Located on or at the side.  
 Latex.--Milky sap.  
 Leaf blade.--The expanded or broader portion of a leaf.  
 Leaflet.--One part of a compound leaf.  
 Legume.--The fruit of the Leguminosae, bilaterally symmetrical and produced from a unilocular ovary, one to many-seeded, variously dehiscent or indehiscent and in some groups articulated into one to several one-seeded portions (cf. loment).  
 Lemma.--The lower of the two bracts immediately enclosing the flower in the grasses.  
 Lenticular.--Having the shape of a biconvex lens.  
 Ligneous.--Woody.  
 Ligulate.--Furnished with a ligule.  
 Ligule.--The flattened, strap-shaped body of the ray flowers of Compositae; also applied to a projection from the top of the sheath in grasses and sedges.  
 Limb.--The expanded, flat portion of a gamopetalous corolla above the throat or the expanded portion of any petal or leaf.  
 Linear.--Long and narrow, with parallel sides or nearly so.  
 Lingulate.--Tongue-shaped.  
 Lobe.--Any segment or part of an organ usually indicated by a division to about the middle.  
 Lobed.--Divided into or bearing lobes.  
 -locular.--Having locules.  
 Locule.--Cavity, compartment, or cell of an ovary, anther or fruit.  
 Loculicidal.--Dehiscent into the cavity of a cell of an ovary between the partitions into the cavity.  
 Lodicule.--One of the small scales in the base of the flower of a grass.  
 Loess hills.--A characteristic clay formation with vertical cleavage of the soil profile, found in northwestern Missouri and elsewhere as exposed tracts of steep slopes not occupied by trees or shrubs.  
 Loment.--A legume which is composed of one-seeded articles.  
 Lyrate.--Pinnatifid with a large and rounded terminal lobe and with smaller lower lobes.  
 Macrosporangium.--The receptacle in which macrospores develop.  
 Macrospore.--The larger of the two kinds of spore in Selaginellaceae, Isoetes, etc.  
 Maculate.--Blotched or mottled.  
 Masculine.--Staminate.  
 Median.--Pertaining to the middle.  
 Membranaceous, membranous.--Thin, rather soft, and more or less translucent and pliable.  
 -merous.--Referring to the numbers of parts.

Mesocarp.--The middle layer of a pericarp.  
 Microsporangium.--The receptacle in which microspores are developed.  
 Microspore.--The smaller of the two kinds of spore in Selaginellaceae, Isoetes, etc.  
 Midrib.--The central or main rib of a leaf or leaflike part.  
 Monadelphous.--Stamens united by their filaments into a tube or column.  
 Monoecious.--Having stamens and pistils in separate flowers on the same plant.  
 Mucro.--A short and small, abrupt tip.  
 Mucronate.--Tipped with a mucro.  
 Muticous.--Pointless or blunt.  
 Naked flower.--With no floral envelopes (perianth).  
 Naturalized.--Thoroughly established, originally coming from a foreign area.  
 Nectary.--A nectar-secreting gland.  
 Nerve.--A simple or unbranched vein or slender rib.  
 Neutral flower.--A sterile flower with a perianth but without functional stamens or pistils.  
 Node.--A joint where one or more leaves are borne or a knot or knob-enlargement.  
 Nut.--An indehiscent, one-celled, and one-seeded, hard fruit, even if resulting from a compound ovary.  
 Nutlet.--A small or diminutive nut.  
 Ob.--A Latin prefix usually signifying inverted, reversed, or upside-down.  
 Obconical.--Inversely conical, having the attachment at the apex.  
 Obcordate.--Inversely heart-shaped, with the apex lobed and the point at the base.  
 Oblanceolate.--Lanceolate with the broadest portion toward the apex.  
 Oblique.--Unequal-sided or slanting.  
 Oblong.--Two or three times longer than broad and with nearly parallel sides.  
 Obovate.--Inversely ovate.  
 Obovoid.--Having the form of an egg with the broad end apical.  
 Obsolete.--Not evident or rudimentary.  
 Obtuse.--Blunt or rounded at the end.  
 Ochroleucous.--Yellowish-white.  
 Ocrea.--A tubular sheath formed by a fusion of two stipules.  
 Ocreolae.--The smaller or secondary stipular sheaths as in the inflorescences of Polygonum.  
 Olivaceous.--Olive-green.  
 Opaque.--Dull, not shining nor translucent.  
 Opposite.--Two at a node, on opposing sides of a stem or branch.  
 Orbicular.--Circular.  
 Oval.--Broadly elliptical.  
 Ovary.--The part of the pistil which contains the ovules.  
 Ovate.--Having an outline like that of an egg, with the broader end at the base.  
 Ovoid.--A solid sphere with an ovate outline.  
 Ovule.--The body which, after fertilization, becomes the seed.  
 Pale.--A chaffy scale such as often subtends the fruit in Compositae.  
 Palea.--The upper one of the two bracts which, with the lemma, encloses

the flower in grasses.

Palmate.--Lobed or divided in a handlike fashion.

Pandurate.--Fiddle-shaped.

Panicle.--A loose, irregularly compound inflorescence with pedicellate flowers, such as a branched raceme or corymb.

Panicled, paniculate.--Borne in a panicle; resembling a panicle.

Papilionaceous.--Having a standard, wings, and keel, as in the corolla of many Leguminosae.

Papillose.--Bearing minute, pimple-like projections.

Pappus.--The modified, calyx-limb in Compositae, etc., forming a plumose, bristle-, scale-like, or other type of crown at the summit of the achene.

Parasitic.--Growing on and deriving nourishment from another plant.

Parietal.--Borne on or pertaining to the wall or inner surface of a capsule.

Parted, -partite.--Cleft nearly, but not quite, to the base.

Pectinate.--Comblike with narrow, closely set segments.

Pedicel.--The stem of an individual flower.

Peduncle.--Stem of a flower-cluster or of a solitary flower when that flower is the only member of the inflorescence.

Peltate.--Attached to the support by the lower surface away from the margins.

Perennial.--Of 3 or more years' duration.

Perfect.--Having both functional pistil and stamens.

Perfoliate.--A leaf which the stem apparently passes through.

Perianth.--The two outer floral envelopes consisting of the calyx and corolla (when present), but not the stamens and pistils.

Pericarp.--The wall of the matured ovary.

Perigynium.--The inflated sac which incloses the ovary in Carex.

Perigynous.--Borne around the ovary and not beneath it, as when calyx, corolla, and stamens arise from the edge of a cup-shaped hypanthium.

Persistent.--Remaining attached or continuous.

Petal.--A division of the corolla, usually colored or showy.

Petaloid.--Colored and resembling a petal.

Petiole.--Leaf-stalk.

Petioled.--Having a petiole.

Petiolule.--Stalk of a leaflet.

Phyllary.--Involucral bract in the Compositae.

Pilose.--With soft hairs.

Pinna.-- primary division or leaflet of a pinnate leaf or frond.

Pinnate.--Compound and feather-like with the leaflets of a compound leaf on either side of the axis.

Pinnatifid.--Cleft or parted in a pinnate manner.

Pinnule.--A secondary pinna or leaflet in a pinnately compound leaf.

Pistil.--The seed-bearing portion of the flower, consisting of the ovary, style, and stigma; the style is sometimes absent.

Pistillate.--Provided with pistils, and without stamens or without functional stamens; the pistil may be simple, consisting of one carpel, or compound, consisting of two or more united carpels.

Pith.--The soft spongy center of the stem of most seed plants.

Placenta.--A part which bears ovules in the interior of the ovary.

Plane.--With flat surface.

Plicate.--Folded into plaits, as in a fan, usually lengthwise.

Plumose.--Feather-like with long fine hairs.  
 Pollen.--The grains containing the male element in the anther.  
 Polygamo-dioecious.--Polygamous but chiefly dioecious.  
 Polygamo-monoecious.--Polygamous but chiefly monoecious.  
 Polygamous.--With hermaphrodite and unisexual flowers on the same or on different individuals of the same species.  
 Polypetalous.--Having separate petals.  
 Posterior.--At or toward the back, or toward the axis.  
 Prickle.--A small and more or less slender spinelike outgrowth from the epidermis.  
 Primocane.--The first year's cane (usually without flowers) of *Rubus* and similar genera.  
 Procumbent.--Trailing or lying flat, but not rooting.  
 Prostrate.--Lying flat upon the ground.  
 Puberulent.--Minutely pubescent.  
 Pubescent.--Covered with hairs, especially short, soft hairs.  
 Punctate.--With translucent or colored dots or depressions.  
 Pyriform.--Pear-shaped.  
 Quadrate.--Nearly square in form.  
 Raceme.--A simple inflorescence of stalked flowers arising from a more or less elongated, common axis.  
 Racemose.--In racemes; or resembling a raceme.  
 Rachilla.--A secondary axis, as in the grasses and sedges for the floral axis.  
 Rachis.--The axis of an inflorescence or of a compound leaf.  
 Ray.--The branch of an umbel or similar inflorescence or the straplike marginal flower of many *Compositae*, when differentiated from the disk flower.  
 Receptacle.--The more or less enlarged or elongated end of the stem or flower axis on which some or all of the flower parts are borne.  
 Recurved.--Curved downward or backward.  
 Reflexed.--Abruptly recurved or bent downward.  
 Regular flower.--With the parts in each series alike or uniform, as stamens all like each other, petals all like each other.  
 Relic or relict.--Localized plants apparently surviving from past geological epochs.  
 Reniform.--Kidney-shaped.  
 Reticulate.--In the form of network.  
 Revolute.--Rolled backward with the margins rolled toward the lower side.  
 Rhizome.--An underground or prostrate, usually horizontal, stem, rooting at the nodes and becoming upcurved at the apex.  
 Rhombic.--With the outline of an equilateral oblique-angled figure.  
 Rhomboid, rhomboidal.--A solid with a rhombic outline.  
 Rib.--A primary or prominent vein of a leaf.  
 Ribbed.--With prominent ribs.  
 Rootstock.--Same as rhizome, sometimes used for elongate, unmodified rooting underground offshoots.  
 Rosette.--A cluster of leaves or other organs in a circular form.  
 Rotate (corolla).--Wheel-shaped with a short tube and with a flat and circular outline.  
 Rotund.--Rounded in outline.

Ruderal.--Growing in waste places or among rubbish.  
 Rudiment.--An imperfectly developed and functionally useless organ.  
 Rufous or rufescent.--Reddish-brown.  
 Rugose.--Wrinkled.  
 Runcinate.--Coarsely or sharply cut with the lobes pointing backward or toward the base.  
 Runner.--A slender trailing shoot which roots at the nodes.  
 Sagittate.--Shaped like an arrowhead, the basal lobes pointing downward or backward.  
 Salverform or salver-shaped (corolla).--Having a slender tube and an abruptly expanded, flat limb.  
 Samara.--An indehiscent, winged fruit.  
 Scabridulous.--Slightly rough.  
 Scabrous.--Rough to the touch.  
 Scale.--Mostly dry, thin, scarious leaves or bracts.  
 Scape.--A leafless flowering stem rising from the ground.  
 Scarious.--Thin, dry, and membranaceous, not green.  
 Scurfy.--With scalelike particles.  
 Secund.--Directed to one side only, usually by twisting.  
 Seed.--The ripened ovule, consisting of the embryo and its proper coats.  
 Sepal.--A division of a calyx.  
 Septate.--Divided by partitions.  
 Septicidal (capsule).--Dehiscing along the partitions and between the locules.  
 Sericeous.--Silky.  
 Serrate.--Having sharp teeth pointing forward.  
 Serrulate.--Finely serrate.  
 Sessile.--Without stalk of any kind.  
 Seta.--A bristle.  
 Sheath.--A tubular envelope surrounding an organ or part.  
 Shrub.--A woody perennial, smaller than a tree, usually with several stems or trunks from the base.  
 Shut-ins.--Granite or porphyritic trachyte, rocky formations or bluffs in the southeastern Ozarks, intersected by streams.  
 Silky.--Covered with close-pressed soft and straight pubescence.  
 Sinuate.--With the outline of the margin strongly wavy.  
 Sinus.--The space or recess between two lobes.  
 Smooth.--Without roughness.  
 Sordid.--Dirty in color, of an impure white.  
 Sorus (pl. sori).--The fruit-dots or clusters of ferns.  
 Spadix.--A spike with a fleshy axis.  
 Spathe.--A large, leaflike or colored bract surrounding an inflorescence.  
 Spermatophyte.--A plant with true seeds.  
 Spicate.--Arranged in or resembling a spike.  
 Spike.--An unbranched simple inflorescence with the flowers sessile or nearly so upon a more or less elongated common axis.  
 Spine.--A sharp, woody or stiff outgrowth arising from the wood of the stem.  
 Spontaneous.--Appearing by itself without having been planted.  
 Sporangium.--A spore-case or a sac bearing spores.  
 Spore.--A simple reproductive body found in the pteridophytes and lower orders usually composed of a single detached cell and containing no embryo.

Spur.--A hollow saclike or tubular projection on some part of a flower.  
 Squarrose.--Having the parts spreading or recurved at the end.  
 Stamen.--Pollen-bearing organ of the flower.  
 Staminate.--Having stamens and no pistils.  
 Staminode, staminodium.--A sterile stamen, or a structure resembling such.  
 Standard.--The upper and broad more or less erect petal of a papilionaceous flower.  
 Stellate.--With starlike hairs having radiating branches.  
 Sterile.--A flower without pistil or a stamen without an anther.  
 Stigma.--That part of a pistil or style which receives the pollen.  
 Stipe.--The stalklike support of a pistil or the "leaf-stalk" of a fern frond.  
 Stipular.--Pertaining to stipules.  
 Stipulate.--Having stipules.  
 Stipule.--An appendage at the base of a petiole or leaf or on each side of its insertion.  
 Stolon.--A runner, or any basal branch that takes root.  
 Stramineous.--Straw-colored.  
 Striate.--Marked with fine, long, longitudinal lines or ridges.  
 Strigose.--Provided with appressed sharp straight and stiff hairs.  
 Style.--The usually elongated part of the pistil connecting the stigma and ovary.  
 Sub.--A Latin prefix, usually signifying "somewhat" or "slightly."  
 Subtend.--To be situated below and close to, as a bract underneath a flower.  
 Subulate.--Awl-shaped, tapering from base to apex.  
 Succulent.--Juicy, fleshy, soft, and thickened in texture.  
 Suffruticose.--Pertaining to a low and somewhat woody plant.  
 Sulcate.--Grooved or furrowed lengthwise.  
 Superior ovary.--An ovary that is free from the calyx or perianth and with the perianth inserted below it on the receptacle.  
 Symmetrical (flower). Regular as to the number of its parts, and with the same number of parts in each series.  
 Synonymous.--Having the same meaning.  
 Synonymy.--The series of discarded names for identical objects.  
 Taxa.--Plural of taxon.  
 Taxon.--Unit of classification, referring to a taxonomic group of any rank, such as form, variety, subspecies, species, genus, family, order, class, and division.  
 Tendril.--A slender clasping or twining process or extension of the stem or leaf.  
 Tepal.--Sepal and petal of similar form not readily differentiated from one another.  
 Terete.--Circular in transverse section.  
 Terminal.--At the tip or distal end.  
 Ternary, ternate.--In threes.  
 Tetragonal.--Four-angled.  
 Thallus.--A plant body without true leaves or stems.  
 Thorn.--Same as spine.  
 Throat.--The opening into a gamopetalous corolla or calyx or the part between the tube and the limb.  
 Thyrses.--A contracted cylindrical or ovoid and usually compact panicle.  
 Tomentose.--Densely pubescent with matted wool or soft, dense hairiness.

Tomentulose.--Finely tomentose.  
 Torus.--The receptacle of a flower, or of the flowers of a head in the Compositae.  
 Trailing.--Prostrate but not rooting and unable to support itself.  
 Transverse.--In a crosswise direction.  
 Tree. A woody plant that produces one main trunk.  
 Trifoliate.--Having a leaf of three leaflets.  
 Trigonous.--Three-angled.  
 Triquetrous.--Having three angles.  
 Triternate.--Three times three with the leaflets or segments of a twice ternate leaf again subdivided in three parts.  
 Truncate.--Appearing as if cut off at the base or apex nearly or quite straight across.  
 Tuber.--A thickened, short, underground branch with numerous buds or eyes.  
 Tuberous.--Tuber-like in appearance or character.  
 Tubular.--Cylindrical, narrow, and circular in cross-section.  
 Turbinate.--Top-shaped.  
 Twig.--A young woody stem or the shoot of a woody plant representing the growth of the current season and terminated basally by a terminal bud-scar.  
 Umbel.--An inflorescence in which the peduncles or pedicels of a cluster arise from a common point.  
 Umbellate.--Pertaining to umbels.  
 Umbo.--A conical projection arising from the surface.  
 Umbonate.--With a stout projection in the center.  
 Undulate.--With a wavy surface or margin.  
 Unilocular.--Having one locule.  
 Unisexual.--Having one sex, either staminate or pistillate only.  
 Valve.--One of the units into which a capsule splits.  
 Velutinous.--Clothed with a velvety hairiness consisting of erect straight hairs.  
 Venation.--Arrangement of veins.  
 Ventral.--Belonging to the anterior or inner face of an organ.  
 Vernal.--Appearing in the spring.  
 Vernation.--The arrangement of leaves in bud.  
 Verrucose.--Covered with wartlike elevations.  
 Versatile.--Referring to an anther which is attached near its middle and capable of turning on its support.  
 Verticillate.--Arranged in a whorl of three or more leaves or other organs in a circle around the axis.  
 Villous.--Bearing long and soft, but not matted hairs.  
 Viscid.--Sticky or clammy.  
 Viviparous.--Sprouting or germinating on the parent plant.  
 Weed.--A troublesome or aggressive plant which intrudes where not wanted in some places, but may be desirable in other places.  
 Weedy.--With the attributes of a weed.  
 Whorl.--An arrangement of leaves or other organs in a circle around the stem.  
 Wing.--Any membranous or thin expansion bordering or surrounding an organ, also applied to the petal of a papilionaceous corolla.  
 Woolly.--Clothed with long, soft, and more or less matted hairs.  
 Zygomorphic.--Irregular with a corolla divisible into equal halves in one plane only, usually along an anterior-posterior line.





# FIELD IDENTIFICATION CARDS

BY

ANDREW F. ROBINSON, JR.

The Field Identification Cards will help identify rare and sensitive species. Some pictures were supplied by botanists whose names appear with those photographs.

The number in the upper right corner is the species reference number. This number is assigned to this species and should be used when ordering field identification cards, species description-management guides or county distribution maps.

The growth form description of the plant is centered at the top of the card, i.e., grass, forb, fern, shrub, tall shrub, woody vine, small tree or tree.

To the left of the growth form description is a family symbol, i.e., typically a diagram of a single flower.

Just below the family symbol, a drawing of the fruit is shown for some species. The arrow(s) indicate(s) the diagnostic feature(s) used in the Identifying Characters section of that card.

Only those characters which distinguish this species from all others are listed under the section labeled Identifying Characters. Diagnostic family characters are listed first. Diagnostic generic characters are just below, and indented. The species characters are listed next, followed by the diagnostic varietal characters when necessary. Thus, a total of four indented sets of diagnostic characters are possible. The characters are defined in the glossary for the species description-management guides.

The dot(s) on the map at the bottom of the card indicate(s) only that the species is present within the state, but does not indicate locations or abundance of the species.

The number in the lower left corner is the year of publication.



FORB

10

## Alabama glade-cress (*Leavenworthia alabamica alabamica*)

Family: Mustard

Flowering date: Late February through March

Habitat: Open limestone glades and clay soils of fields derived from limestone

Identifying Characters:

Petals 4, sepals 4, stamens 4 long and 2 short.

Leaves pinnately lobed and in a basal rosette, none on the stem.

Petals emarginate, greater than 10 mm long; siliques thin and flat.

Styles 2.5 to 5.5 mm long; siliques acute above and below.



1979



FORB

11

## Short-styled glade-cress (*Leavenworthia alabamica brachystyla*)

Family: Mustard

Flowering date: Late February through March

Habitat: Open limestone glades and clay soils of fields derived from limestone

Identifying Characters:

Petals 4, sepals 4, stamens 4 long and 2 short.

Leaves pinnately lobed and in a basal rosette, none on the stem.

Petals emarginate, greater than 10 mm long; siliques thin and flat.

Styles 1.5 to 3 mm long; siliques rounded above and below.



1979



FORB

12

## Fleshy-fruited glade-cress (*Leavenworthia crassa crassa*)

Family: Mustard

Flowering date: Late February through March

Habitat: Limestone glades

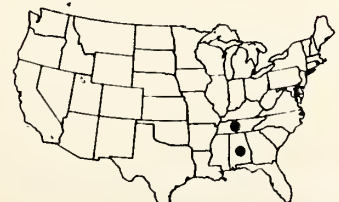
Identifying Characters:

Petals 4, sepals 4, stamens 4 long and 2 short.

Leaves pinnately lobed and in a basal rosette, none on the stem.

Petals deeply emarginate, greater than 10 mm long; siliques thick and fleshy, less than 12 mm long.

Styles 3-6 mm long; siliques 6-10 mm long; petals white to yellow, 10-13 mm long.



1979



Southeastern Area  
State and Private Forestry  
Atlanta, Ga. 30309







Southeastern Area  
State and Private Forestry  
Atlanta, Ga. 30309



PHOTO BY BILLY L. JONES  
MONTAGNARI OTSUYU OTORI  
SPECIAL DELIVERY INTERNATIONAL  
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JOSEPH K. JONES, JR. / 3025 4th AVENUE, A.D. / 3025 4th AVENUE, A.D.



13

## FORB

**Falkville glade-cress**  
(*Leavenworthia crassa elongata*)



Family: Mustard

Flowering date: Late February through March

Habitat: Open limestone glades and clay soil of fields derived from limestone

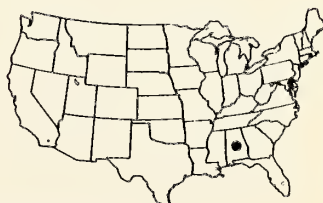
Identifying Characters:

Petals 4, sepals 4, stamens 4 long and 2 short.

Leaves pinnately lobed and in a basal rosette, none on the stem.

Petals deeply emarginate, greater than 10 mm long; siliques thick and fleshy, less than 12 mm long.

Styles 2.5 to 3.5 mm long; siliques 8-12 mm long; petals yellow, 9-11 mm long.



1979



16

## FORB

**Pasture glade-cress**  
(*Leavenworthia exigua lutea*)



Family: Mustard

Flowering date: Late February through March

Habitat: On heavy clay soil around dolomitic limestone outcrops in pastures

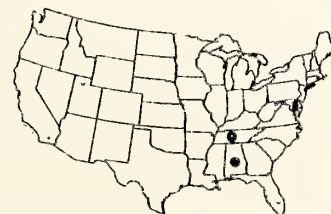
Identifying Characters:

Petals 4, sepals 4, stamens 4 long and 2 short.

Leaves pinnately lobed and in a basal rosette, none on the stem.

Petals shallowly emarginate, less than 10 mm long; siliques thin and flat; terminal leaf lobe angular.

Petals yellow.



1979



29

## TALL SHRUB

**Common southern plume**  
(*Eliottia racemosa*)

Family: Heath

Flowering date: June to August

Habitat: Myrtle oak — Chapman oak evergreen scrub forest of sandhills

Identifying Characters:

Anthers opening by pores.

Tall deciduous shrub or small tree; leaves longer than 12 mm; petals 4, separate; fruit a capsule.



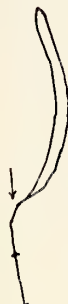
1979



48

## FORB

**Sessile-leaved warea**  
(*Warea sessilifolia*)



Family: Mustard

Flowering date: August through October

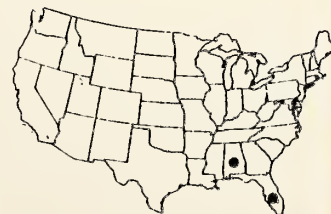
Habitat: Longleaf-pine-turkey oak-sand-hill scrub

Identifying Characters:

Petals 4, sepals 4, stamens 4 long and 2 short

Siliques stipitate

Leaves sessile, auriculate but not clasping the stem



1979





52

**SHRUB****Florida coontie**  
(*Zamia integrifolia*)

Family: Cycad

Flowering date: Late winter and early spring

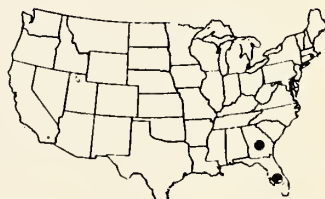
Habitat: Sandy pinelands, scrub, hammocks and kitchen-middens

Identifying Characters:  
Leaves leathery, pinnately compound; seeds borne in erect cones.

Stems underground, enlarged and starchy; leaf division less than 15 pairs.



1979



55

**FORB****Hairy wild-indigo**  
(*Baptisia arachnifera*)

Family: Legume

Flowering date: Late June into July

Habitat: Low sandy ridges in longleaf pine-saw palmetto — galberry flatwoods

Identifying Characters:

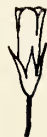
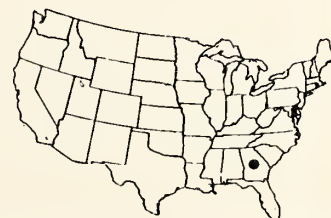
Flowers zygomorphic; pistils 1, simple; fruit a legume.

Stems herbaceous, without prickles; stamens 10, filaments distinct; ovary stalked; fruit inflated.

Stems and leaves densely white hairy; leaves simple, sessile and exstipulate.



1979



59

**FORB****Wiregrass gentian**  
(*Gentiana pennelliana*)

Family: Gentian

Flowering date: October into March

Habitat: Sandy peat of wet pineland savannas or pineland clearings

Identifying Characters:

Stems herbaceous; leaves opposite, exstipulate; petals united at the base; ovary 1 locule; placentation parietal.

Leaves foliaceous; petals convolute in bud, lobe of corolla shorter than tube.

Flower solitary; petals white, spotted blue-green internally.



1979



70

**FORB****Bent golden-aster**  
(*Heterotheca flexuosa*)

Family: Aster

Flowering date: September and October

Habitat: Sandy clearings in sandpine, evergreen scrub or longleaf pine — turkey oak scrub near the coast

Identifying Characters:

Flowers in involucre heads; anthers united forming a tube; ovary inferior.

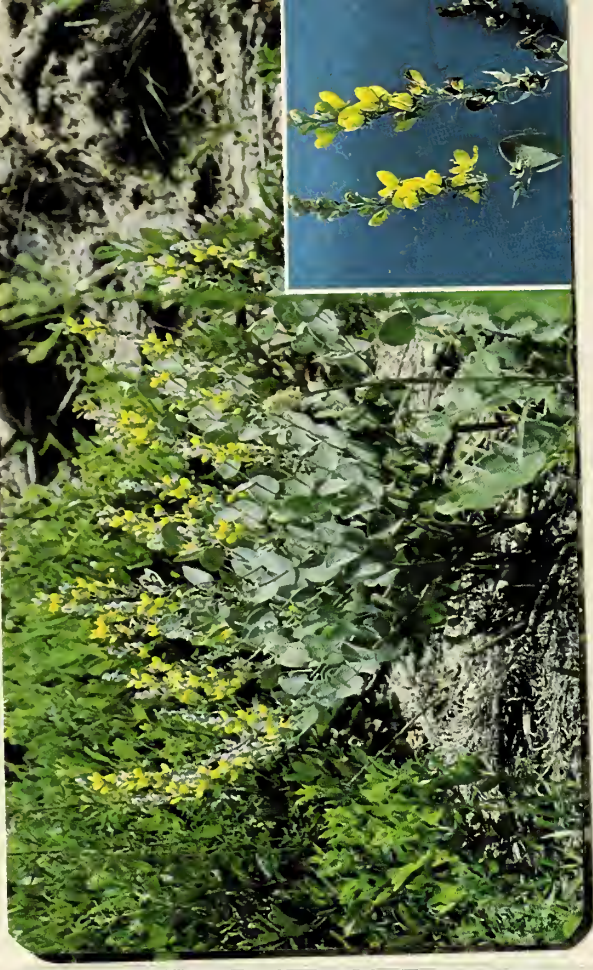
Leaves grass-like and covered with silky-tomentose hairs; involucre imbricate; ray and disc corollas yellow, disc perfect; pappus well developed and in 2 series of capillary bristles.

Stems conspicuously zig-zag and covered with wooly tomentose hairs; stem leaves few, linear, pubescent.



1979





LEWIS & CLARK MOUNTAIN

CHIEF BOX, JESSE'S EXHIBIT, MOUNTAIN, CALIFORNIA, 1935



90

**SHRUB****Large-flowered rosemary**  
(*Conradina grandiflora*)

Family: Mint

Flowering date: All year

Habitat: Sandy flats or sand hills,  
mostly with sand pine and  
evergreen scrub oaks

## Identifying Characters:

Stems square; leaves opposite;  
flowers zygomorphic with a deeply  
4-lobed ovary.Stem woody; flowers borne in  
leaf axils; corolla tube strongly  
bent.Lower corolla lip longer  
than 12 mm; lateral lobes  
wider than long.

1979



123

**FORB****Godfrey's gay-feather**  
(*Liatris provincialis*)

Family: Aster

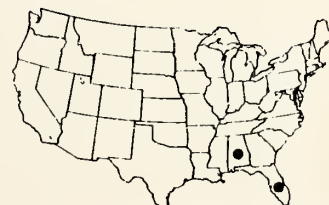
Flowering date: September and October

Habitat: Sandy clearing in sandpine,  
evergreen scrub or longleaf pine-  
turkey oak scrub

## Identifying Characters:

Flowers in involucre heads; anthers  
united forming a tube; ovary inferior.Stems erect; stem leaves entire,  
alternate and smaller than basal  
leaves; heads arranged in spikes  
containing only purplish disc  
flowers; involucres lacking spines  
or prickles.Leaves decreasing in length  
from the base to the in-  
florescence; heads spreading,  
12-15 mm long; involucre  
bracts erect, linear, tips long  
acuminate; pappus bristles  
barbellate.

1979



134

**FORB****Yellow-petaled Harper's beauty**  
(*Harperocallis flava*)

Family: Lily

Flowering date: May

Habitat: Pine flatwood — savanna  
bogs

## Identifying Characters:

Flowers conspicuous; sepals 3  
often petaloid; petals 3; ovary  
superior.Leaves equitant, more than 2,  
and basal leaves larger than  
scale-like cauline leaves; scape  
with 1 terminal flower; tepals  
yellow.

1979



162

**FERN****American Hart's-tongue fern**  
(*Phyllitis scolopendrium*  
*americana*)

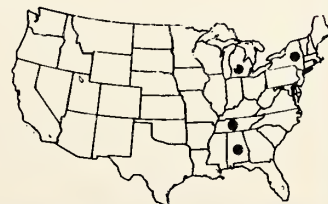
Family: Fern

Habitat: Cool, moist, shaded faces of  
calcareous rocks

## Identifying Characters:

Terrestrial ferns; sporangia with a  
lateral, flattened, spheroidal cap-  
sule surrounded by a vertical an-  
ulus of thick-walled cells.Fronds evergreen, unlobed, un-  
dulate and oblong in outline;  
sori longer than broad, about  
halfway between midrib and  
edge of leaf and in regular  
rows.

1979







177

**FORB****Persistent trillium**  
(*Trillium persistens*)

Family: Lily

Flowering date: Mid-March to mid-April

Habitat: Next to rhododendron in steep ravines of hemlock-pine-hardwood forests

## Identifying Characters:

Flowers conspicuous, sepals 3 often petaloid; petals 3; ovary superior.

Leaves 3, whorled; flower solitary and terminal.

Leaves sessile, tips acuminate to acute; flowers on an erect peduncle; petals less than 8 mm wide.



1979



196

**TREE****Florida willow**  
(*Salix floridana*)

Family: Willow

Flowering date: March

Habitat: Calcareous floodplain woods

## Identifying Characters:

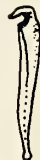
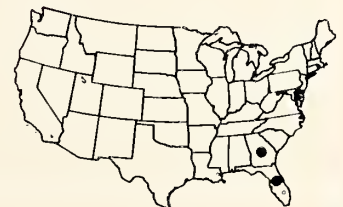
Dioecious trees or shrubs; petals absent; flowers borne in catkins; bracts of female catkin deciduous.

Leaves lanceolate to elliptic; buds covered by a single scale.

Leaves serrate, wider than 3 cm; densely gray-pubescent below when young.



1979



205

**FORB****Parrot pitcher-plant**  
(*Sarracenia psittacina*)

Family: Pitcher-plant

Flowering date: March

Habitat: Wet areas in pine flatwoods and on roadside ditch banks

## Identifying Characters:

Flowering stem leafless; leaves pitcher-shaped, hollow; stigma umbrella-shaped.

Only 1 Genus.

Leaves decumbent; orifice of leaf cavity laterally surrounded and hidden by subglobose hood; corolla maroon to pink; sepals externally maroon to red.



1979



206

**SHRUB****Common needle palm**  
(*Rhapidophyllum hystrix*)

Family: Palm

Flowering date: Spring

Habitat: Swamps and rich woods of coastal plain

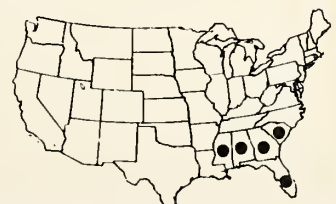
## Identifying Characters:

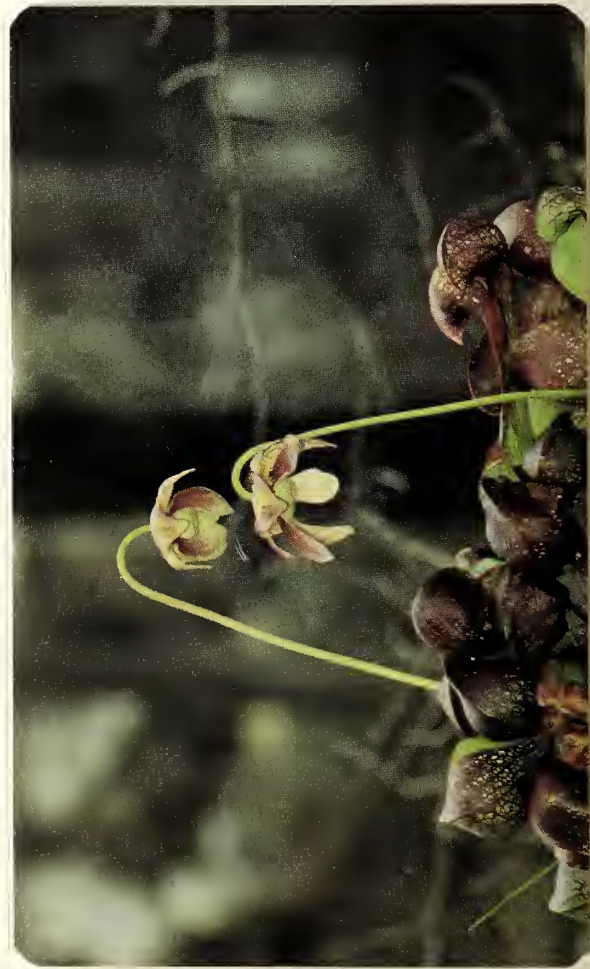
Trees or shrubs with plicate leaf blades greater than 3 dm wide, perianth petaloid.

Stems erect, 1 to 4 dm tall, armed with stiff dark needle-like spines 2 dm long.



1979





PLANT OF THE FOREST

PLANT OF THE FOREST

**FERN****Hand adder's-tongue fern**  
(*Ophioglossum palmatum*)

Family: Adder's-tongue

Habitat: Epiphytic upon cabbage palm  
in hammocks of southern  
Florida

## Identifying Characters:

Terrestrial ferns; stipe forks forming a sterile blade and a fertile leafless segment; sporangia large, globular or ellipsoidal, annulus lacking.

Sterile blades simple; sporangia in a double row below tip of fertile segment.

Epiphytes pendant; sterile blade palmately lobed.



1979





